16 Howe did not live to see women get the vote in 1920 or to see Mother's Day become an official holiday. Today, many people do not recognize her name. Just the same, American society is still touched by her work. The song "Battle Hymn of the Republic" still moves us as Americans. Perhaps most important is her example, which shows us that all people can find a way to help the causes they believe in and make a difference in the world.

from *Battle Hymn of the Republic*

Mine eyes have seen the glory of the coming of the Lord:
He is trampling out the vintage where the grapes of wrath are stored;
He hath loosed the fateful lightnings of His terrible swift sword:
His truth is marching on.

Comprehension Check

1. In paragraph 3, what does the word *abolition* mean?

- **a.** writing poetry and songs
- **b.** ending slavery
- **c.** making society better
- **d.** fighting in the Union army

2. When Julia Ward Howe mentions her *wont* (paragraph 8), she is talking about her

- **a.** tiredness from working hard.
- **b.** refusal to give up.
- **c.** usual way of behaving.
- **d.** desire to help others.

CLOSE READING

3. Compare the author's account with the words of Julia Ward Howe herself. What causes resulted in Howe's writing "Battle Hymn of the Republic"?

4. Reread paragraphs 8–10. What information does Julia Ward Howe include in her description of writing "Battle Hymn of the Republic" that does not appear in the secondhand account in paragraph 6? How do these firsthand details affect you, as a reader?

Compare and Contrast Texts

In this unit, you read about ways in which Americans have tried to make people's lives better. Think about what you have learned from the texts in this unit. Then choose two of the texts and compare and contrast how earlier Americans affected their own society and our society today. Which person or group did more to improve our society? Be prepared to discuss your ideas with the class.

<table>
<tr><td>Person or group:
Effect on their own society:
Effect on society today:</td><td>Person or group:
Effect on their own society:
Effect on society today:</td></tr>
<tr><td colspan="2">The stronger effect on our society:</td></tr>
</table>

Return to the Essential Question

How can authors support their purpose in writing an informational text?

In small groups or as a class, discuss the Essential Question. Think about what you have learned about word meanings, text structures, and comparing and contrasting accounts. Use evidence from the four unit texts to answer the question.

LANGUAGE

Synonyms and Antonyms

Guided Instruction **Synonyms** are words with the same meaning or similar meanings. **Antonyms** are words with opposite meanings. Comparing a word with its synonyms and antonyms can help you understand what a word means.

Read this sentence from "Helping the Union": *At first, she thought that the idea was absurd—that in a war, only men could make a difference.*

Look at the chart to see examples of synonyms and antonyms of *absurd*.

absurd	**synonyms**	*ridiculous, foolish*
	antonyms	*wise, reasonable*

Guided Practice Write whether each word in parentheses is a synonym or antonym of the underlined word.

1. ____________ . . . I approve much of your conclusion, that, in the meantime, we should draw all the good we can from this world. (judgment)

2. ____________ . . . the reflection gave me more chagrin than the whistle gave me pleasure. (embarrassment)

3. ____________ . . . neither had I the practical deftness which the preparing and packing of sanitary stores demanded. (awkwardness)

Independent Practice Write a synonym and an antonym for the underlined word in each sentence.

1. . . . when I was tempted to buy some unnecessary thing, . . .

____

2. Instead, she found a novel way to help the Union cause.

____

UNIT 7 REVIEW

Read the following passage in which vocabulary words, text structures, and different accounts appear. Then answer the questions on pages 175 and 176.

How Smallpox Was Defeated

(Genre: Explanatory Text)

1 Smallpox used to affect people all over the world. Many who got the disease died. The survivors often were left blind or horribly scarred.

2 In the early 1700s, a new treatment from China came to Europe. Doctors put ooze from a pox under the skin of a healthy person. This treatment was a primitive vaccine that safeguarded people against the disease.

3 In the American colonies, many were suspicious of the treatment. Benjamin Franklin was opposed at first. However, he became a supporter after his son died of smallpox. "In 1736 I lost one of my sons, a fine boy of four years old, by the small-pox . . . I long regretted bitterly, and still regret that I had not given it to him by inoculation." Later, a real smallpox vaccine was developed. Today, smallpox does not exist outside of laboratories.

Fill in the circle of the correct answer choice.

1. In paragraph 2, describing the vaccine as *primitive* means that it was

○ dangerous.
○ uncivilized.
○ simple.
○ not working.

2. What does the word *opposed* in paragraph 3 mean?

○ suspicious
○ fearful
○ supportive
○ against

UNIT 7 REVIEW

3. What is an antonym of *suspicious* (paragraph 3)?

○ thoughtful ○ jealous

○ confident ○ horrified

4. In paragraph 2, what is a synonym for *safeguarded*?

○ protected ○ predicted

○ warned ○ tested

5. Underline the clues that tell you what this text is going to explain to readers.

6. Circle the firsthand account that appears in this explanatory text.

7. What problem did the people of the 1700s face? How was this problem solved?

____

____

8. How does this text's use of chronological order help you understand the fight against smallpox?

____

____

9. What could Benjamin Franklin not know about smallpox?

____

____

10. What is the effect on the reader of Benjamin Franklin's account of why he changed his mind?

____

____

Introducing UNIT 8

"What do you think?" "What's your opinion?" We often are asked to give an opinion on a topic. We often are asked to think about other people's opinions, too. In this unit about writing opinion pieces, you will learn how to present an opinion about a topic that is important to you.

To express an opinion effectively, you should have a clear statement at the beginning of the piece. You then should support that opinion with good reasons and with evidence—facts and details that show why your reasons make sense. A clear restatement of the opinion will help you end the piece well.

Your goal in writing an opinion piece is to convince the reader that your opinion is correct. Clear thinking—and, as always, correct grammar—will help make that happen.

Progress Check Can I?

Before Unit 8		After Unit 8
☐	State an opinion clearly.	☐
☐	Organize an opinion essay in a clear and appropriate fashion.	☐
☐	Provide reasons supported by facts and details.	☐
☐	Use formal and informal English correctly.	☐
☐	Use frequently confused words correctly.	☐
☐	Use helping verbs (modal auxiliaries) correctly.	☐

HOME ✦ CONNECT...

In this unit, children will learn about writing pieces that **express an opinion** about a specific topic. Opinions come in many formats—editorials, TV commercials, political speeches, and more—so help your child recognize the various ways that opinions are expressed in the world around him or her.

As your child reads opinions on various topics, discuss why the writer is convincing. For example, guide your child to find a **clearly stated opinion, reasons that are supported by facts and details,** and **words and phrases that link the reasons to the opinion**. Then ask your child whether he or she agrees with the opinion and why (or why not).

Apply this discussion to your child's reading, as well. For example, ask your child his or her opinion about a story, poem, or book. You might even have him or her prepare an informal review and share it with the family.

Activity: Select an issue related to making the world a better place that is often discussed in your home or community or in the news. Have your child develop an opinion on the subject. Ask your child to think of reasons that support his or her position. Be sure to share your opinion, too, and to support it with strong reasons.

IN THIS UNIT, YOUR CHILD WILL...

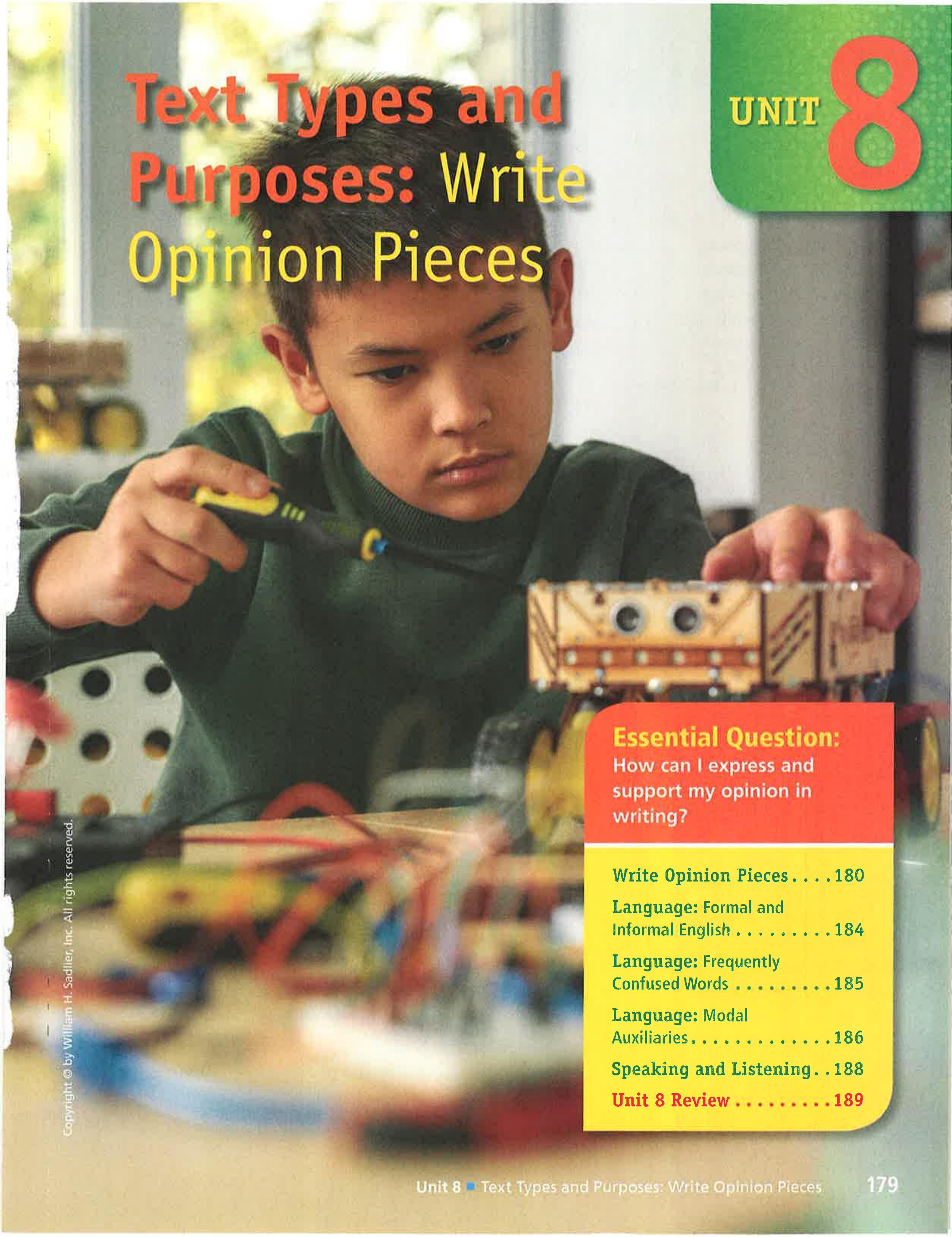
- Learn to write opinion pieces about topics or texts, supporting his or her point of view with reasons and information.
- Build writing by introducing a topic clearly, stating an opinion, and then grouping related ideas together.
- Provide reasons that are supported by facts and details.
- Use appropriate words and phrases to link reasons to an opinion.
- Learn specific language skills:
    - Use formal or informal English, depending upon the situation.
    - Use frequently confused words (for example, *to/too/two, there/their,* and *whether/weather*) correctly.
    - Use modal auxiliary verbs (for example, *can, may,* and *must*) to express certain conditions.

WAYS TO HELP YOUR CHILD

Encourage your child to express opinions—and when he or she does so, listen to what he or she says. Ask questions about why your child holds this opinion. Ask about supporting details and information that help make his or her case.

ONLINE

For more Home Connect activities, continue online at sadlierconnect.com



UNIT 8

Text Types and Purposes: Write Opinion Pieces

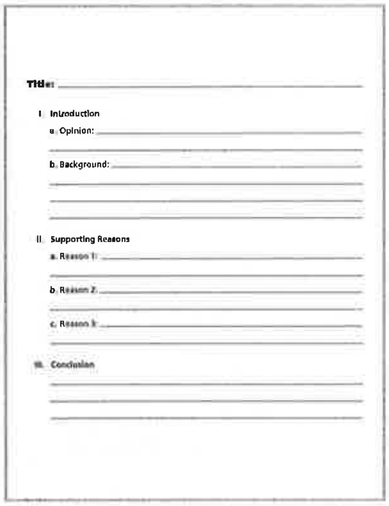
Essential Question:
How can I express and support my opinion in writing?

Write Opinion Pieces 180
Language: Formal and Informal English 184
Language: Frequently Confused Words 185
Language: Modal Auxiliaries 186
Speaking and Listening . . 188
Unit 8 Review 189

WRITE OPINION PIECES

CREATING AN ORGANIZATIONAL STRUCTURE

Sanjay has used an outline to organize his editorial. It states his opinion, provides background information, gives three reasons that support his opinion, and ends with a conclusion.


Title: ____

I. Introduction
  a. Opinion: ____
  b. Background: ____
II. Supporting Reasons
  a. Reason 1: ____
  b. Reason 2: ____
  c. Reason 3: ____
III. Conclusion

TITLE

- Gets the reader thinking about the topic

INTRODUCTION

- Presents the topic and the writer's opinion

Underline the sentence that presents Sanjay's opinion.

Read a Student Model

Sanjay is a student in Ms. Lincoln's fourth-grade class. He has been asked to write an opinion piece that answers this question: *What is the most important invention of the past 100 years?* Sanjay has been asked to organize his writing and to support his point of view with reasons and information. As you read his essay, think about how you might support your point of view as you prepare to write your own opinion piece.

Martin Cooper holding a smartphone and the world's first mobile phone

The Most Important Invention

There have been many important inventions during the past 100 years. Advances in science and technology have made our lives better in many ways. New inventions allow doctors to diagnose and cure more illnesses. Engineers can build bigger, more efficient buildings. That said, the most important invention of the past 100 years is the smartphone.

Smartphones were developed from mobile phones. The first call on a mobile phone happened on April 3, 1973, when Martin Cooper placed a call on the Motorola company's new device in New York City.

The phone was 9 inches long, and it weighed 2.5 pounds. It had a talk time of 30 minutes, and it needed 10 hours to recharge the battery. Furthermore, the first mobile phones cost almost $4,000!

Technology has improved greatly since then. Today's smartphones are much lighter, have hours of battery life, and cost much less. It is their role in our lives today, however, that makes them so important.

The original mobile phone could only place and receive calls. Today's smartphones are important, first of all, because they can do much more. For example, the smartphone is a powerful computer. It allows me to send and receive e-mails and texts, as well as make and receive phone calls. I can use it to take pictures and videos and to play music and games—and it fits in the palm of my hand.

In addition, smartphones are very important because they make the latest technology available to almost anyone. According to a Nielsen survey, 114 million people in the United States, or 50.4 percent of the population, owned a smartphone in 2012. That number is rising all the time.

As a result of the smartphone's popularity, a new industry of creating applications, or apps, has risen. Some designers of popular apps have gone on to start successful companies.

LINKING WORDS AND PHRASES

- Use words and phrases to link the opinion to the reasons that support it.

Circle any linking words and phrases that you see on this page.

REASON 1:

- Provide strong reasons to support the opinion.
- Sanjay uses the phrase *first of all* to identify his first reason and to link it to his opinion.

REASON 2:

Underline the sentence that states Sanjay's second reason.

- Facts and details should support each reason.

Draw a box around the facts and details that support the second reason.

REASON 3:

Put a star by the sentence that states Sanjay's third reason.

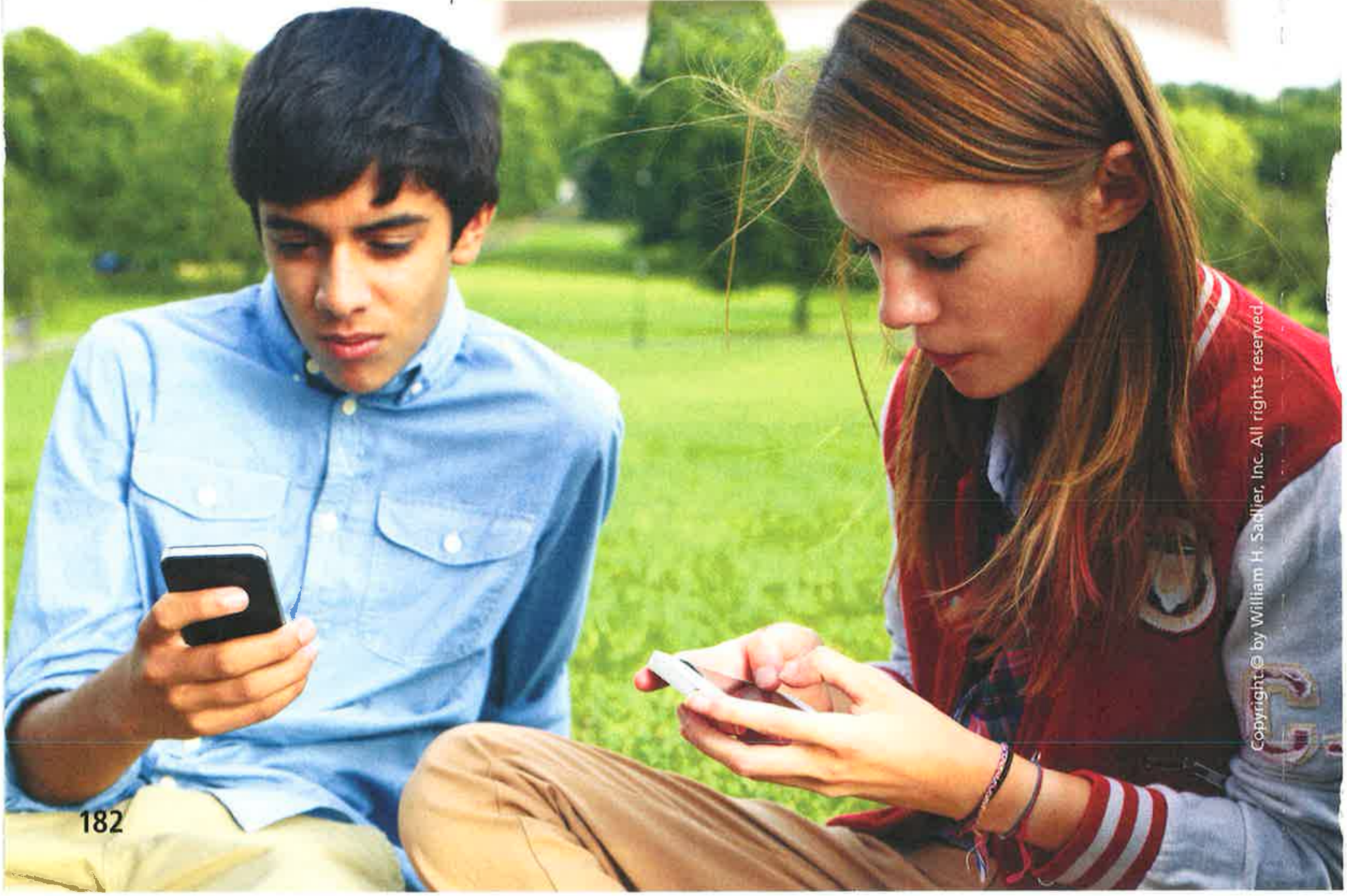
Finally, smartphones are especially important in emergencies. In a natural disaster, such as a hurricane, people often can use a smartphone to contact relatives and friends. Smartphone apps can help people find out about road closures and can direct people to emergency services. New apps are being developed to meet the rising demand for such help.

CONCLUSION

Sanjay's conclusion restates his opinion, but in slightly different words. It also summarizes his reasons in an interesting way.

Underline the sentence that repeats Sanjay's opinion.

Nothing else can match the importance of the smartphone in today's world. People can use their smartphones to be in immediate contact, no matter who they are or where they are. They can do research and have fun with their smartphones, too. They might even use their smartphones to save lives! What great things this little device can do!



Use an outline like the one below to organize your own opinion essay about the development from the past 100 years that has had the greatest effect on your life. Then write a first draft of your essay on a separate sheet of paper. In your draft, be sure to support your reasons with facts and details and to use words and phrases to link those reasons to your opinion. You will use this draft to write your final essay in the Unit 8 Review section on page 190.

Title: ____________________

I. Introduction

a. Opinion: ____________________

b. Background: ____________________

II. Supporting Reasons

a. Reason 1: ____________________

b. Reason 2: ____________________

c. Reason 3: ____________________

III. Conclusion

Formal and Informal English

Guided Instruction Written and spoken English can be formal or informal. Formal English is used when it is important to be "proper"—for example, when you are presenting an idea for a group to consider. Informal English is more casual. It is used in everyday conversations and communication—for example, when you are chatting with friends. Informal English uses contractions; formal English does not. In addition, the word choices and sentence structures in formal English often are more complicated than the ones in informal English.

- **Formal:** *Please notify Mr. Smith that his presence is required in the auditorium.*
- **Informal:** *Tell Mr. Smith that we need him in the auditorium.*

Guided Practice Identify each sentence as an example of **formal** or **informal** English.

1. The data indicate that the growth rate increases with the amount of sunlight. ____________
2. When you get a chance, give me a call, OK? ____________
3. What is the estimated time of your completion of the project? ____________
4. When I saw them running toward me, hollering like crazy, I figured they were freaked about something. ____________

Independent Practice Rewrite the first sentence so that it uses formal English. Rewrite the second sentence so that it uses informal English.

1. Great news! Your proposal won!

____

____

2. I am departing because I feel that this film is dull and cannot fulfill my demands for quality entertainment.

____

____

Frequently Confused Words

Guided Instruction Some words in English sound alike but have different spellings and different meanings. These words are called **homophones**. Here are some examples.

to (preposition indicating motion) **too** (also) **two** (a number)	**there** (in that place) **they're** (contraction for *they are*) **their** (belonging to them)
you're (contraction for *you are*) **your** (belonging to you)	**accept** (to receive or agree) **except** (preposition indicating leaving something out)
weather (what the climate is like) **whether** (if)	**hear** (to listen) **here** (in this place)

Guided Practice Underline the correct homophone in each sentence.

1. Aunt Lisa asked (weather / whether) we had eaten dinner.
2. They went to (they're / their / there) cabin for the weekend.
3. I want a treat, (too / two / to)!

Independent Practice Review the homophones in the chart. Then complete each sentence with the correct homophone.

1. I know ____________ upset, but you should try to calm down.
2. Maylee likes every flavor ____________ grapefruit.
3. After tryouts, Sam hoped that the team would ____________ him as a member.
4. Did you ____________ anything about what the ____________ will be like on Saturday?
5. As a warm-up, I am going ____________ run ____________ laps around the track.

Modal Auxiliaries

Guided Instruction **Modal auxiliaries**, or helping verbs, are used with main verbs to express conditions. When a modal auxiliary is combined with the main verb, it creates a verb phrase.

Modal Auxiliary	Used to Express
can	ability
may	permission or possibility
must	strong belief or obligation
will	something that will happen in the future
should	the best action, which happens in past, present, or future

In the following sentence examples, the modal auxiliary is double-underlined and the main verb is underlined.

- *José can sing better than anyone else I know.*
  (José has great singing ability.)
- *Yes, you may go to the movies with Tanya's family.*
  (You have my permission to go.)
- *My keys may be in my coat pocket.*
  (My keys possibly are there—or they may be elsewhere.)
- *I must tell the truth about this.*
  (I strongly believe in being truthful.)
- *All students must finish their papers by Friday.*
  (The students have an obligation to do so.)
- *Keiko will be absent for the next three days.*
  (Her absence is in the future.)
- *We should get to school on time tomorrow.*
  (It would be good for us to do so.)

Guided Practice In each of the following sentences, underline the modal auxiliary. Then write what condition it expresses.

1. All band members must attend the rehearsal today. ____________________
2. Ben should finish his project by then. ____________________
3. Everyone who scored a 90 or better on the test may skip this homework assignment. ____________________
4. Elaine will watch that movie the day it opens. ____________________
5. Please, may I have a second helping? ____________________

Independent Practice Write your own sentences that express the conditions indicated.

1. Ability:

____

____

2. Permission:

____

____

3. Strong belief:

____

____

4. Best action:

____

____

5. Future happening:

____

____

SPEAKING AND LISTENING

Discuss the Essential Question

How can I express and support my opinion in writing?

Think about the Essential Question by responding to the questions below. Support your point of view with reasons, facts, and details.

1. What facts did the writer present to support his position about the most important invention of the past 100 years?

____

____

____

2. What are some phrases the writer used to link his opinion to reasons?

____

____

____

Use your notes above to discuss the Essential Question in small groups or as a class. Follow agreed-upon rules for discussion. Use the organizer below to record what you heard and how you participated.

	Ideas I Agree or Disagree With	Questions I Asked
Agree		
Disagree		
	New Ideas I Had During Discussion	**Questions I Answered**

UNIT 8 REVIEW

This paragraph is written in informal English. It also has mistakes in homophones and modal auxiliaries. On the lines below, rewrite the paragraph so that it is correct and uses more formal English.

> If you ask me, the coolest invention of the past 100 years will be the TV. Everybody needs TV programs to here stuff about news, whether, and politics. TV also must give us entertainment, allowing us to watch shows and movies whenever we feel like it. Without TV, their would be nothing too do.

UNIT 8 REVIEW

Assignment: Write an opinion essay about the development of the past 100 years that has had the greatest effect on your life.

On the lines below, write the final copy of the opinion essay draft you created on page 183. Be sure you state your opinion clearly and develop your topic with reasons, facts, and details. Use linking words to connect your opinion and reasons, and provide a strong conclusion reinforcing your opinion. See the Writing Handbook (pages 275–283) for ways to improve your writing as you revise.

Introducing UNIT 9

Have you ever felt challenged in trying to achieve a goal? A challenge can be anything from overcoming a fear to solving a tough math problem to running a race. In this unit, you will see how characters in some works of traditional literature face challenges as they try to accomplish their goals or complete difficult journeys.

What is "traditional literature"? It is stories that have been handed down, generation after generation, for hundreds and even thousands of years. It includes some of our oldest stories: myths, folk tales, fables, legends, and epics. These kinds of stories are different in many ways, but they have much in common. They usually take place long ago and far away. They have fantastic elements, such as monsters, magical objects, and animals that talk. They have very basic kinds of characters: the hero, the villain, the princess, the trickster. They are often about heroes who are on a quest—an important personal journey marked by challenges that the hero has to face and overcome. Traditional literature also often has a moral, or lesson, for readers to understand and remember.

In this unit, you will learn to make connections between several very different examples of traditional literature.

Progress Check *Can I?*

Before Unit 9		After Unit 9
☐	Make connections between a written story and a story told in pictures.	☐
☐	Compare and contrast stories with similar topics or themes.	☐
☐	Explain the meanings of idioms and common sayings.	☐

HOME ✦ CONNECT...

Many children's books use illustrations to accent the text. Your child probably already has experience in **making connections between visuals and the text of a story**. Expand upon that experience by talking about examples in books, comic strips, and graphic novels. You also might use a print or online news story illustrated with a photograph or video clip to discuss the connection between the visual and the story events.

Stories told both in print and on film use **similar themes, topics, and patterns of events**. In movies, for example, many films focus on a young character on a heroic journey, accompanied by a variety of unusual characters. Suggest a topic (for example, good *vs.* evil), a theme (for example, the power of friendship), or a story pattern (for example, a quest). Then brainstorm with your child stories and films that contain it. Discuss why you think some of these themes, topics, and patterns of events appear in stories so often.

On the Go: Ask your child to make connections between everyday life and familiar stories. For example, you may have an interaction with someone who reminds your child of a character type (such as a wise older person), an event (such as a quest to reach a challenging personal goal), or a theme (such as taking a stand for what you believe is right). Ask your child to be as specific as he or she can. If the event connects with a favorite work of your own, share that with your child, too.

IN THIS UNIT, YOUR CHILD WILL...

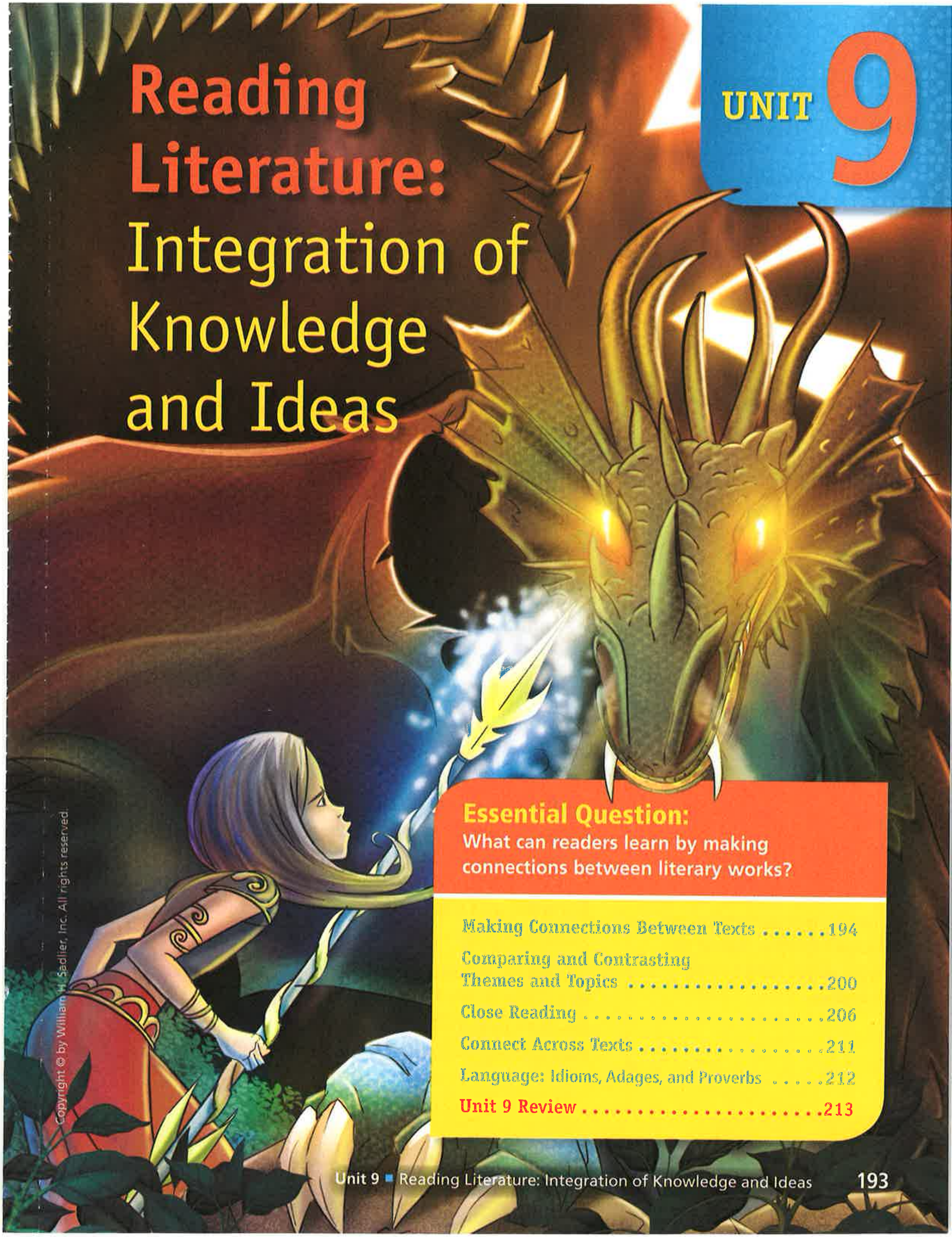
- Make connections between illustrations and the moments in the stories that the illustrations represent.
- Compare and contrast different kinds of texts that share a similar topic, theme, or pattern of events.
- Recognize and explain the meaning of common idioms, adages, and proverbs.
- Compare and contrast three texts on the same theme: the pairing of an epic and a graphic novel, the pairing of a folk tale and a fable, and a tall tale (legend).

WAYS TO HELP YOUR CHILD

Encourage your child's imagination and speaking skills by inviting him or her to create and share original stories. These stories may be inspired in various ways, but the topic and plot of each one should be clear. Ask questions that encourage your child to think about each story's theme and to explore connections that the story may have to other stories that he or she has enjoyed.

ONLINE

For more Home Connect activities, continue online at sadlierconnect.com



UNIT 9

Reading Literature: Integration of Knowledge and Ideas

Essential Question:
What can readers learn by making connections between literary works?

Making Connections Between Texts 194
Comparing and Contrasting Themes and Topics .200
Close Reading 206
Connect Across Texts 211
Language: Idioms, Adages, and Proverbs 212
Unit 9 Review 213

WORDS TO KNOW

declined
oppressed
tyrant

A **story** can be presented in **text**, in **visuals**, or in both. The visual version will **depict** **details** from the text version.

CITE EVIDENCE

A In traditional literature, such as an epic, characters are often described in broad, general terms. They are "kind" or "cunning" or "wise." In paragraph 1, Gilgamesh is described as "a powerful king." Circle another phrase in paragraph 1 that describes Gilgamesh. Can you think of a character from another story or from real life who could be described in the same way?

B Underline an action that Ishtar takes in paragraph 4. What does Panel 3 of the graphic novel show about this moment that the text does not include? Which version of this scene do you think is more dramatic?

Gilgamesh's Quest for Immortality

(Genre: Sumerian Epic)

1 Once upon a time, long ago and far away in the ancient land of Sumer, there was a powerful king named Gilgamesh who was part human and part divine. He ruled the great city of Uruk, which was walled in on all sides. Gilgamesh was an imposing **tyrant** and ruled with an iron fist. He **oppressed** the people of Uruk without remorse. It was a terrible time to live in Uruk.

2 The people prayed and prayed, and their prayers were finally answered. The goddess Aruru took some clay and threw it onto the ground. A huge, hairy beast of a man rose from the clay. His name was Enkidu, and he was created to challenge Gilgamesh and free Uruk from the tyrannical king's clutches.

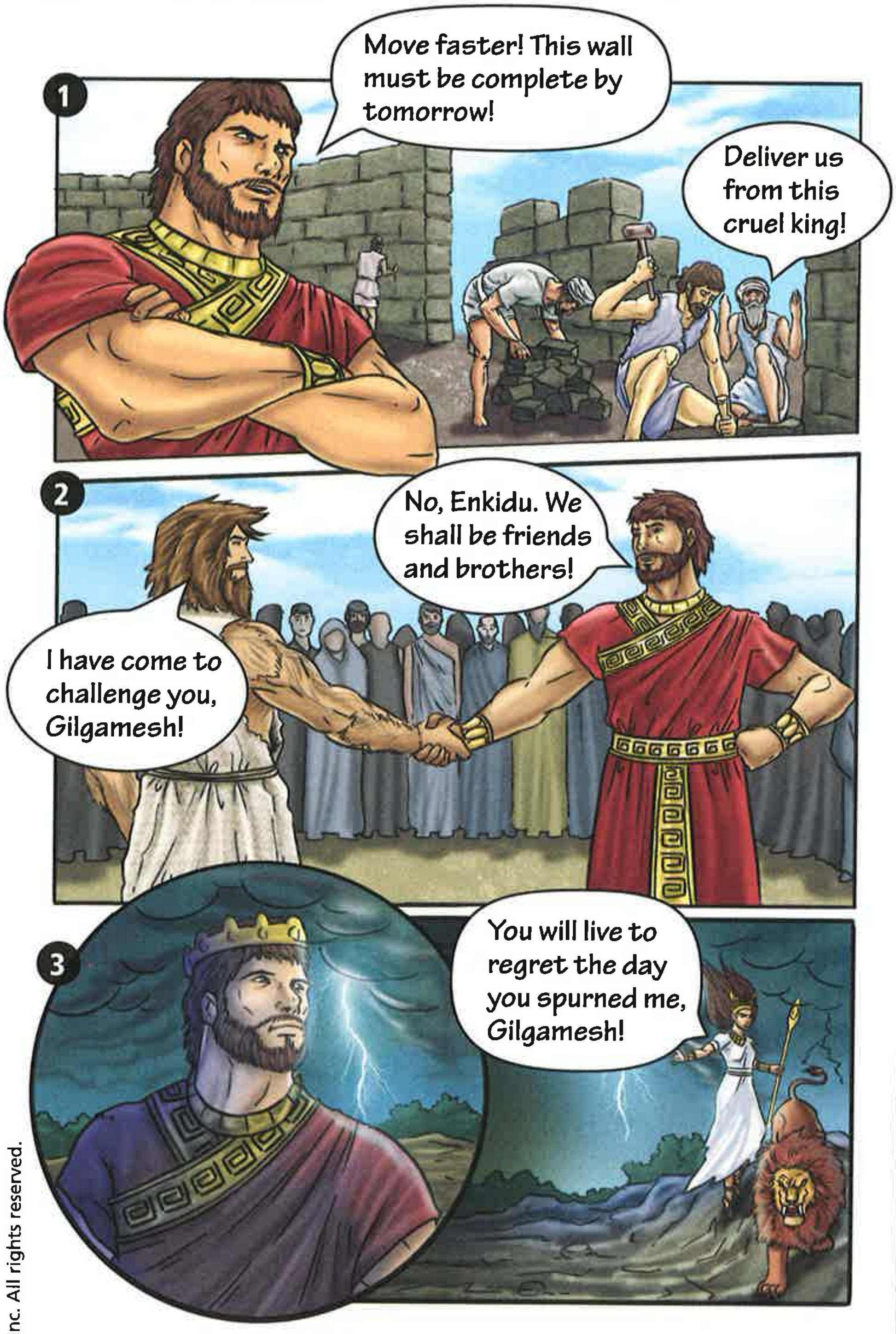
3 But something else happened. Over time, Gilgamesh and Enkidu became great friends—best friends, in fact. They were inseparable. City dwellers were struck by the contrast of their gleaming, statuesque king and his wild companion. The two fought many battles together.

4 After one especially tough fight, Gilgamesh washed himself and placed his crown atop his head. At that moment, he was so stunningly handsome that the goddess Ishtar proposed marriage to him. He **declined** her offer, and Ishtar, humiliated, flew into a rage and vowed revenge on Gilgamesh.

5 Ishtar knew how to punish Gilgamesh. Summoning her powers, she ordered the earth to open up and swallow Enkidu. Instantly, Gilgamesh's beloved friend was gone forever, their bond permanently broken.

INTEGRATION OF KNOWLEDGE AND IDEAS

Guided Instruction


1
Move faster! This wall must be complete by tomorrow!
Deliver us from this cruel king!
2
No, Enkidu. We shall be friends and brothers!
I have come to challenge you, Gilgamesh!
3
You will live to regret the day you spurned me, Gilgamesh!

Comprehension Check

Compare and contrast the text version to the panels from the graphic novel version. What details from the text version appear in the graphic novel? What additional details are provided? How does the visual version help your understanding of the story?

CITE EVIDENCE

C A **visual presentation** of a story shows specific details from the text. How does Panel 1 of the **graphic novel** show that Gilgamesh is a "tyrant"? Draw a box around the part of the panel that illustrates how Gilgamesh's way of ruling affects his people. Explain whether the graphic novel or the text provides a more vivid idea of how Gilgamesh rules.

D The text says that Enkidu and Gilgamesh became best friends. Draw a box around where this is indicated visually in Panel 2. What other details are included in this panel that are not in the text? Why does the graphic novel version presents the scene in this way?

Guided Practice

WORDS TO KNOW

collapse
treacherous
volume

CITE EVIDENCE

A Circle the text that matches Panel 1 on this page. How does the illustration reflect the written description?

B Underline the text that connects to the scene in Panel 2. Discuss with a partner: In a complete version of this graphic novel, should several panels be devoted to details of the sea journey, or would it be more important to get quickly to the meeting with Faraway?

Gilgamesh's Quest for Immortality *continued*

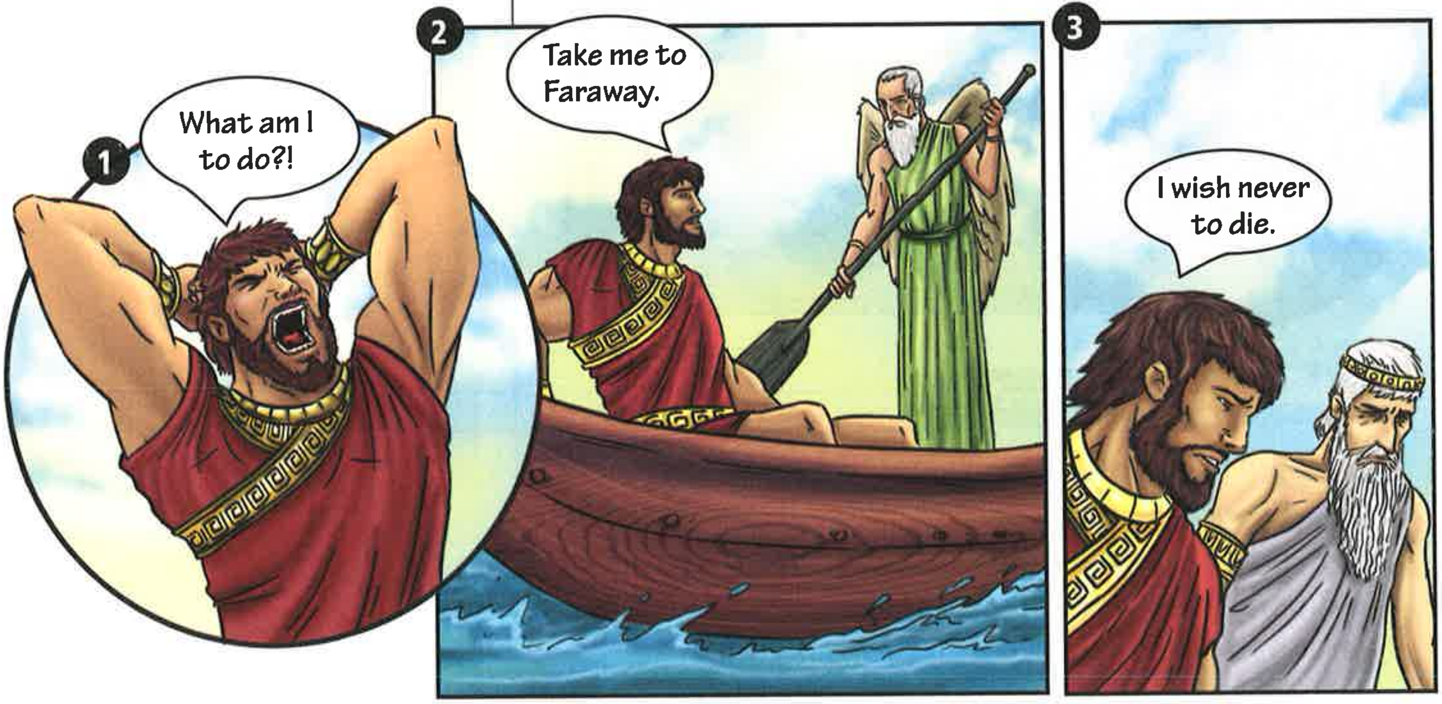
6 Upon learning of his friend's death, Gilgamesh let out a long, painful wail. Its **volume** was deafening. He pulled out his hair and tore at his clothes.

7 "What am I to do?" Gilgamesh cried. "My best friend is lost to me forever!" He wandered the woods for days, determined to avoid Enkidu's fate. At last he decided, "I must find a way to live forever, in case Ishtar will come for me next. I shall seek the man called 'Faraway.'"

8 Gilgamesh set out alone on a long, difficult journey. He traveled along a **treacherous** mountain pass, past two gruesome scorpion-men, through a tunnel under the mountains themselves, and finally to a ferryman who could guide him across the sea. After chopping down a tree to make a boat rudder, Gilgamesh was on the verge of **collapse**. But he and the ferryman finally began the 45-day journey across the sea.

9 Despite rough seas and high winds, Gilgamesh arrived at the place he was seeking. The man called Faraway was standing on the shore, waiting.

10 "I wish never to die," Gilgamesh told him.


1
What am I to do?!
2
Take me to Faraway.
3
I wish never to die.

Guided Practice

11 "That is impossible," the man replied, "for death is a mystery, and it must come to us all."

12 But Gilgamesh pleaded with him, describing his journey and his friend Enkidu. Faraway was moved—and, more important, he was convinced.

Comprehension Check

1. What does it mean that Faraway was "convinced" by Gilgamesh's story?

- **a.** He believed that Gilgamesh should know the secret of living forever.
- **b.** He believed that Gilgamesh had gone to a lot of trouble to see him.
- **c.** He believed that Gilgamesh truly missed his friend Enkidu.
- **d.** He believed that Gilgamesh had been badly treated by Ishtar.

2. If there were a panel after Panel 3, what would it probably show?

- **a.** Gilgamesh looking toward the ferryman and saying, "I want to go home to my city of Uruk."
- **b.** Gilgamesh looking at Faraway and saying, "Death is a mystery, isn't it?"
- **c.** Faraway looking at Gilgamesh and saying, "That is not possible, for death must come to us all."
- **d.** Gilgamesh saying, "I'm looking for a man called 'Faraway.'"

3. With a partner, discuss which visuals you think best connect with the text. Point out text details as you talk. Then choose one panel and tell how you might have drawn and written it differently.

Independent Practice

WORDS TO KNOW

immensely
retrieve
transformed

CITE EVIDENCE

A Underline the sentence in paragraph 14 that connects with Panel 1. How does the action remind you of other brave actions you have read about, seen in movies, or know about?

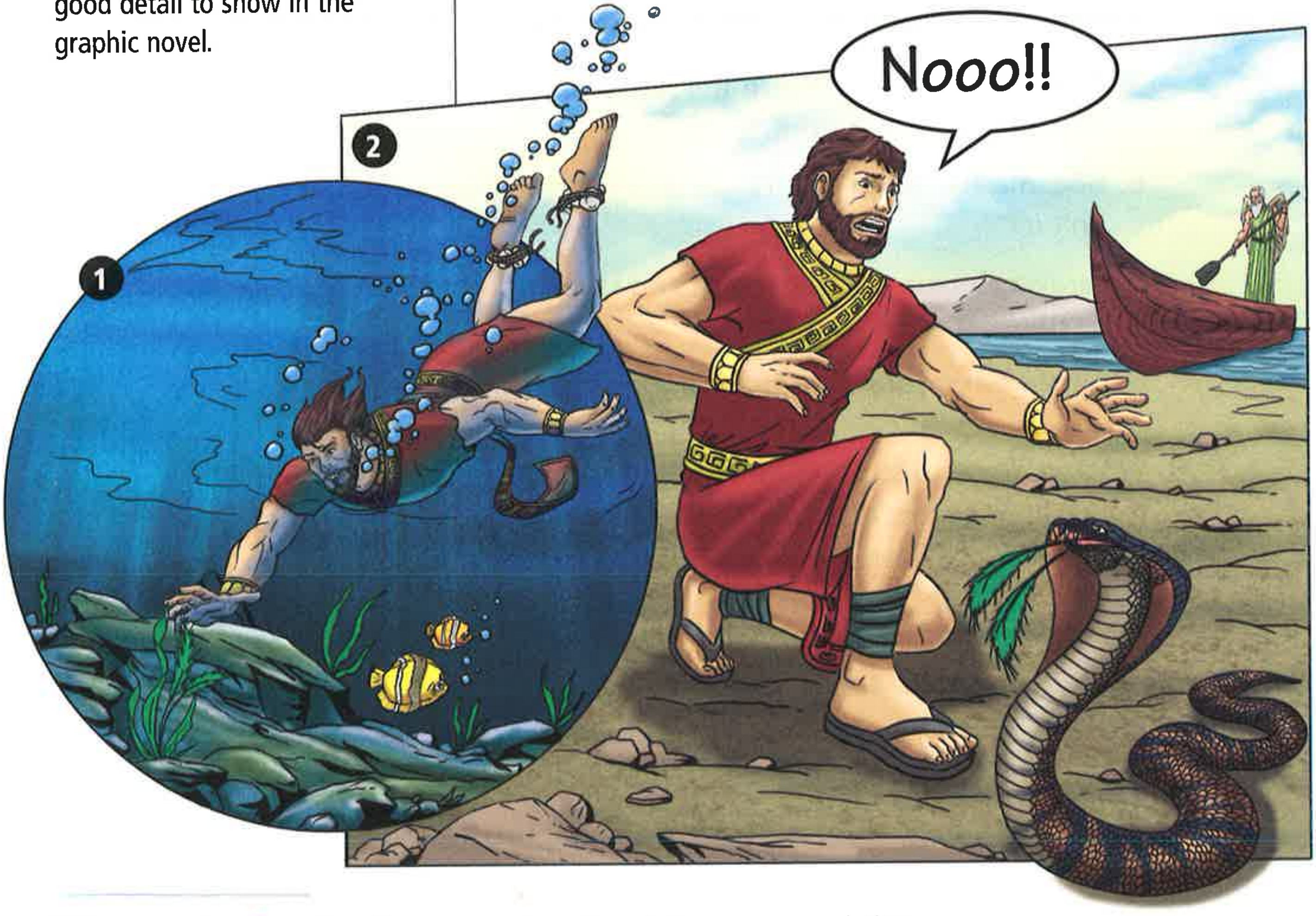
B In paragraph 15, circle the detail shown in Panel 2. Then discuss whether this was a good detail to show in the graphic novel.

Gilgamesh's Quest for Immortality *continued*

13 The wise man revealed a secret to Gilgamesh. "It is a prickly plant that you seek," began Faraway, "and it lives at the bottom of the sea. **Retrieve** it, and you can be **transformed**. It will grant you anything you desire."

14 Gilgamesh tied rocks to his feet and threw himself into the sea. Underwater, he saw the thorny plant and snatched it up. **Immensely** satisfied, Gilgamesh held the plant protectively in his hand.

15 Gilgamesh rejoined the ferryman to prepare to sail home. He could think of nothing but his wish and how he would be able to live forever. But it was not to be. For when they stopped at a natural spring for a drink, and Gilgamesh was not looking, a serpent stole the plant away and ate it. Gilgamesh cried out as the snake's old skin began to shed away, revealing a new skin underneath. The serpent had received the plant's gift.



16 Gilgamesh could only cry, "I have failed! I shall never be immortal!" And with that, Gilgamesh sailed home to the walled city of Uruk, his kingdom, mourning his lost friend and what might have been.

Comprehension Check

MORE ONLINE **sadlierconnect.com**

1. In some cultures, the story of the snake and the plant could be told in a legend of its own. If that legend were told, what would it explain?

a. why snakes shed their skin

b. why snakes are considered dangerous

c. why snakes live forever

d. why some snakes are poisonous

2. Which line from the story would be very difficult to present using only visuals?

a. "Gilgamesh tied rocks to his feet. . . . "

b. "Underwater, he saw the thorny plant and snatched it up."

c. "Gilgamesh could think of nothing but his wish. . . . "

d. " . . . a serpent stole the plant away from him."

3. You have seen only a few panels from a graphic novel version of the epic of Gilgamesh. Which other incidents mentioned in the text would you expect to be presented in a full graphic novel? Are there any parts of the text that could be left out of a graphic novel presentation? Cite details in your answers.

COMPARING/CONTRASTING THEMES AND TOPICS

Guided Instruction

WORDS TO KNOW

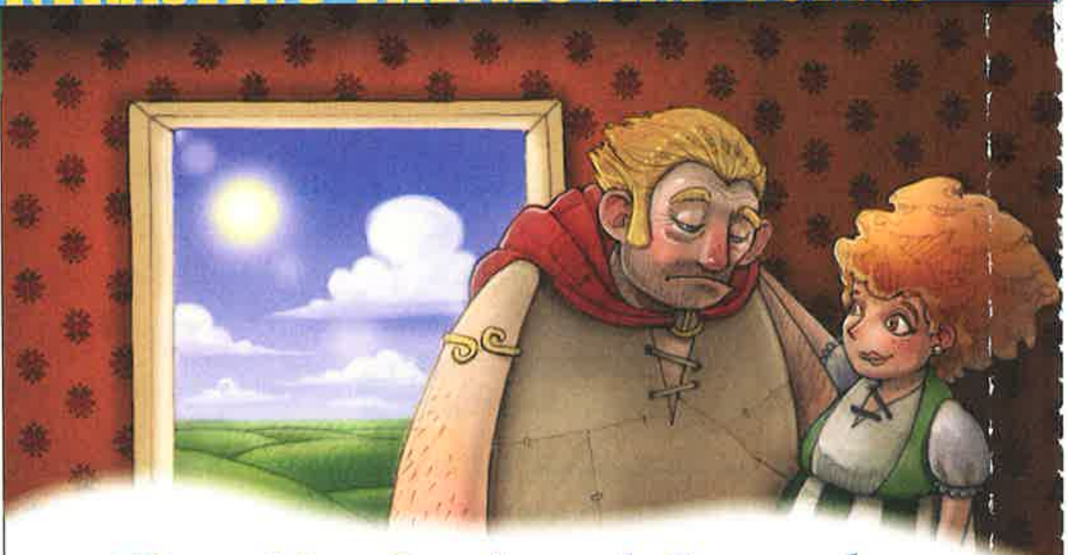
challenge
devoted
griddle
labored

It is useful to **compare and contrast** the **themes, topics,** and **patterns of events** in traditional literature.

CITE EVIDENCE

A The **topic** of many folk tales involves a clash between enemies. Finn MacCool is a hero in this story. Find and underline the name of the villain. What villains can you remember from other stories, TV shows, or movies? Based on your knowledge, what do you think this villain might do?

B Traditional works of literature have common **patterns.** In one pattern, called the quest tale, a hero goes on a journey and has adventures along the way. Another pattern is the trickster tale, in which a clever character outsmarts a villain. Underline a clue in paragraph 10 that suggests this story might be a trickster tale.



Finn MacCool and Oonagh

(Genre: Irish Folk Tale)

1 Long ago, in the beautiful land of Ireland, there lived a giant named Finn MacCool. Finn was enormous and strong, and all day long he worked alongside his giant friends, building a bridge to Scotland. As he **labored** away, his wife was never far from his mind. Oonagh was her name, and Finn was **devoted** to her.

2 They lived together at the very top of tall Knockmany Hill. It was quite a climb to get home every night, and there was never a break from the howling Irish winds. Yet there was a method to Finn's madness: The top of Knockmany Hill was a perfect look-out perch.

3 You see, there was a certain giant in the land who was to be avoided. His name was Cucullin, and although Cucullin prided himself on being the strongest giant of them all, there was one individual he had never dared **challenge**: Finn MacCool. Finn was well aware of this, and that's why he built his home on top of Knockmany Hill, for up there, he would be able to see if Cucullin was coming for him. He knew that day would come.

4 One day, Finn took a break from his work and decided to go home and see his beloved Oonagh.

5 He trekked up the hill and met Oonagh, who gave him a loving tap on his cheek.

6 "Ah, welcome home, ya darlin' rogue," Oonagh smiled, "but what's botherin' ya? I can see't on y'face."

7 "It's Cucullin that's troublin' me," Finn replied, "I believe he's comin' for me."

8 Finn, you see, had a special talent: When he stuck his thumb into his mouth and sucked on it, he could see the future.

9 "Sure enough, he'll come today," Finn mumbled, his thumb in his mouth.

10 "Piece of cake, my darlin' Finn," Oonagh winked. "I've got a plan to hatch."

11 Finn was relieved: His beloved Oonagh was clever, and she had bailed him out before.

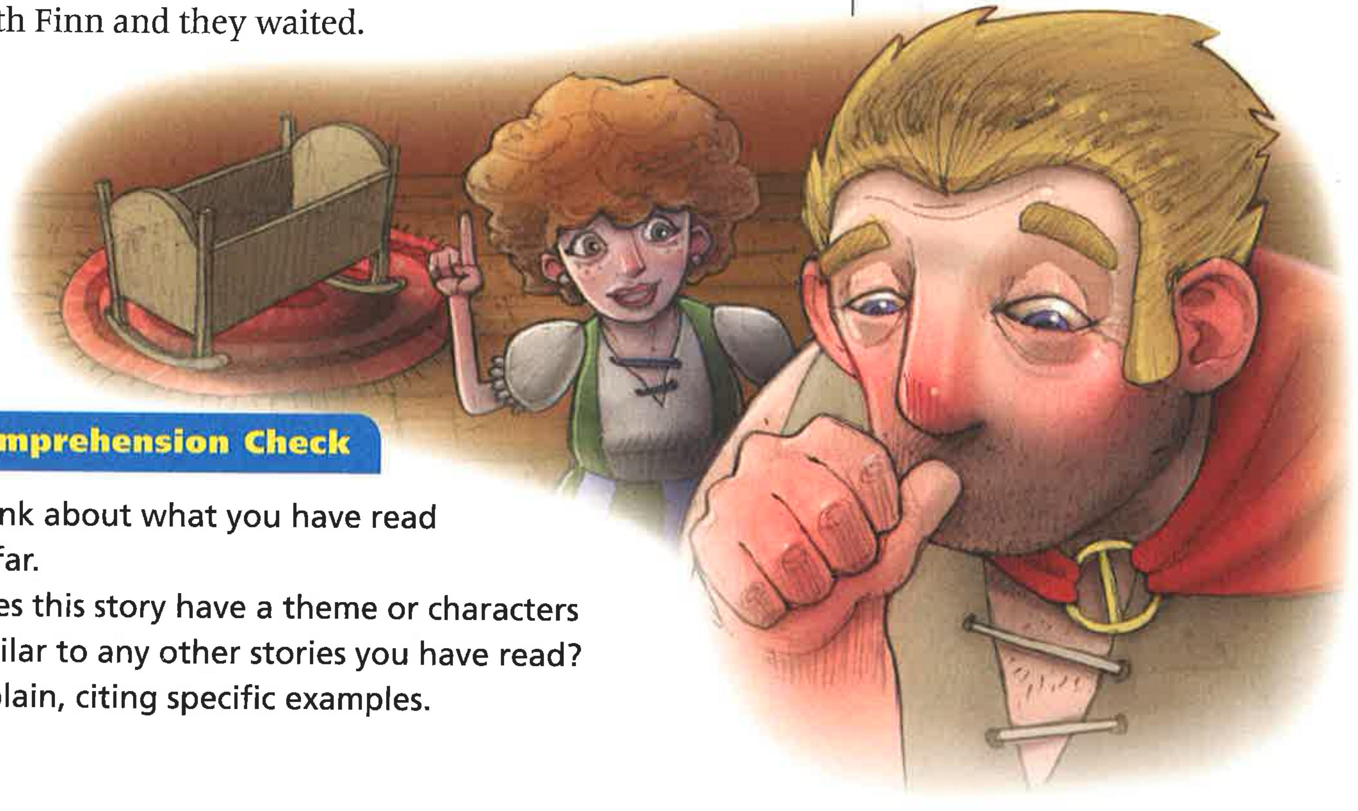
12 Oonagh raced down the hill and went to all of her neighbors, asking for their iron **griddles**. After collecting twenty griddles, she returned home, ground them up, and made griddle cakes—some with iron and some without. This was all she needed to do, so she sat with Finn and they waited.

Guided Instruction

CITE EVIDENCE

C The **theme**, or main idea, of a folk tale is often a moral, or lesson. There are clues to the moral throughout a folk tale. There is a clue in paragraph 10: Oonagh will help Finn. Circle two details in paragraph 11 that show why we might call Oonagh helpful.

D Characters in folk tales may have strange abilities and take strange actions. When Finn sucks his thumb, he can see the future. In paragraph 12, put a star next to the strange action Oonagh takes. What do you think she is doing?



Comprehension Check

Think about what you have read so far.
Does this story have a theme or characters similar to any other stories you have read? Explain, citing specific examples.

Guided Practice

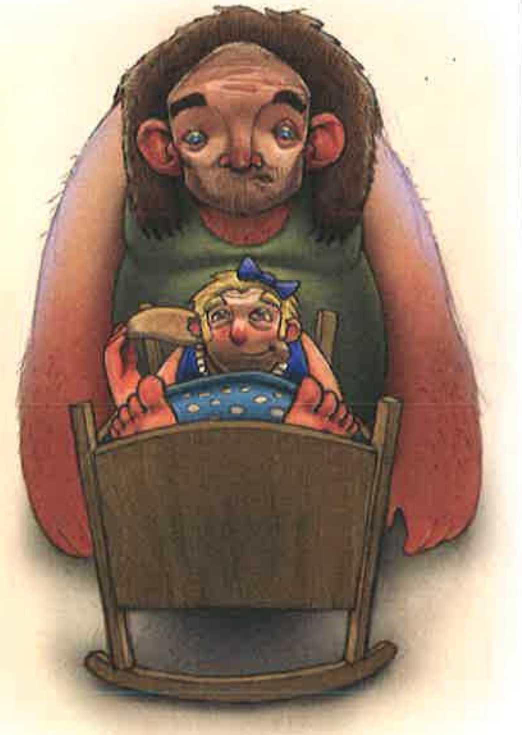
WORDS TO KNOW

concede
derived
perplexed

CITE EVIDENCE

A Put a star by the strange action that Oonagh wants Finn to take. Explain how you know that this is part of Oonagh's plan and that Finn does not know what the plan is.

B Underline the sentence that tells you how Cucullin gets his strength. With a partner, discuss how Cucullin and Finn are alike and different.



Finn MacCool and Oonagh *continued*

13 At 2 o'clock, Finn spied Cucullin climbing up the hill.

14 "All right," Oonagh whispered to Finn, "put on these baby clothes and climb into the crib."

15 Finn looked **perplexed**, but he trusted her.

16 "I'm looking for Finn MacCool," Cucullin bellowed when he saw Oonagh.

17 "I'm sorry, but he's not here," she replied. "He just went off to slay the giant Cucullin."

18 "What? That's *me* you're talkin' about, and I'm here to slay *him*," he exclaimed.

19 "Well, he's not here, but you can wait for him—and maybe you could help me with a few things that he usually does," Oonagh began. "On blustery days like today, he turns the house away from the wind. Would you mind?"

20 "I can do that!" Cucullin bragged. You see, Cucullin had a unique talent as well: He **derived** all his strength from his third finger. So he went outside and, with only his third finger, turned the house.

21 "Thank you," Oonagh said. "You must be hungry, so eat these griddle cakes I've prepared. They're Finn's favorite, but he won't mind."

22 "Griddle cakes!" Cucullin cried. "They're my favorite!" He grabbed two of them and stuffed them into his mouth. "Aaargh!" he screamed. "I've broken my teeth! What are these cakes made of?"

23 "They're just my regular recipe. My baby son loves them, too," Oonagh said as she handed a griddle cake without iron to the boy in the crib (who was Finn disguised as a baby, of course). The "baby" gobbled up the griddle cake easily.

24 Cucullin was stunned. "Why, if the baby can eat those cakes, he must be incredibly strong!"

25 "You can say that again," Oonagh agreed, "but the boy is not nearly as strong as his father."

26 With that, Cucullin changed his mind. "Well," he mused, "I will **concede** defeat and say that Finn MacCool must be the strongest giant of all. But may I inspect this extraordinary boy's teeth?"

27 "You may," Oonagh replied.

Comprehension Check

1. How is Ishtar from the story of Gilgamesh different from Oonagh?

a. Ishtar is very foolish and Oonagh is clever.

b. Ishtar works against the man she loves, but Oonagh helps Finn.

c. Ishtar is mortal but Oonagh is a goddess.

d. Ishtar seems trustworthy and Oonagh is untrustworthy.

2. In "Gilgamesh's Quest for Immortality," Gilgamesh wanted to find a way to live forever. In "Finn MacCool and Oonagh," Finn and Oonagh want to find

a. the perfect recipe for griddle cakes.

b. a way to make friends with the giant Cucullin.

c. a way to keep their house from blowing away.

d. a way to keep Cucullin from challenging Finn.

3. So far in the story, how are Oonagh and Cucullin different? Work with a partner, and be sure to cite text evidence.

Independent Practice

WORDS TO KNOW

brawn
circumstance
custom
tauntingly

CITE EVIDENCE

A Draw a circle around the **theme** or moral of "Finn MacCool and Oonagh." What kind of real-life situation might demonstrate the same theme?

B Draw a circle around the moral of the fable "The Fox and the Snail." What is another way to state this moral?

Finn MacCool and Oonagh *continued*

28 As Cucullin peered into the boy's mouth, Finn saw his chance and bit down hard on Cucullin's special third finger. Cucullin screamed in pain.

29 "That'll teach you, Cucullin! Now, hit the road!" Oonagh shouted. "And don't ever come back!"

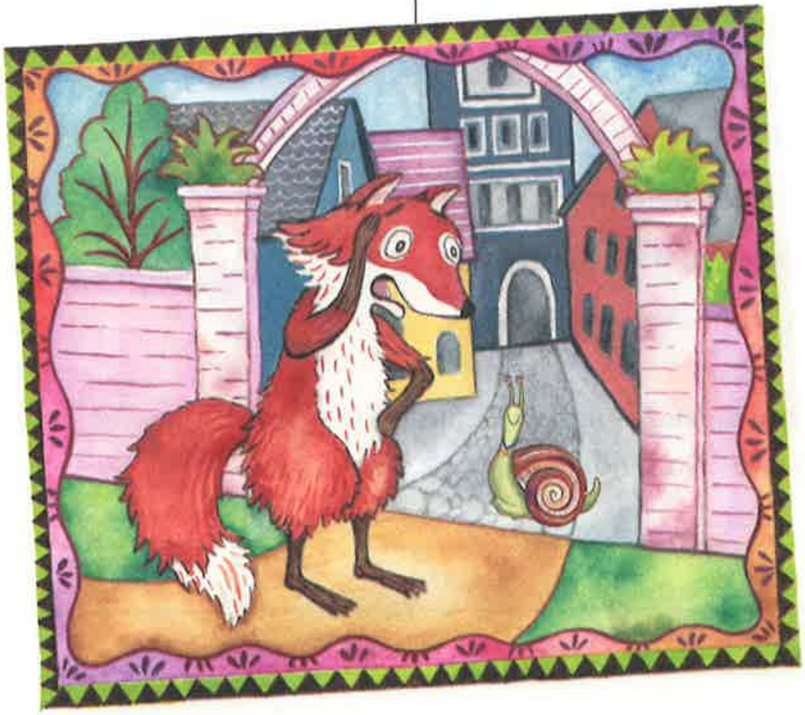
30 Cucullin raced down the hill, never to be seen or heard from again.

31 Finn took off the baby clothes and hugged his wife in gratitude. She had taught him a lesson: Brains are better than **brawn**.

The Fox and the Snail

(Genre: Swiss Fable)

32 One warm summer's day, a wily fox was resting by the meadow. He saw a snail on the ground next to him. "How slow and stupid snails are," he thought. And immediately an idea came to him. He proposed a wager as to which of them could reach town more quickly.



33 "You're on!" said the snail, and he set out immediately. The snail traveled slowly, for he was carrying his house on his back, as was his **custom**.

34 The fox continued his rest, intending to start off in the cool of the evening, and he dozed off. The snail quickly took advantage of this **circumstance** and crept into the fox's thick, bushy tail. As evening approached, the fox took off, surprised that the snail was nowhere to be seen.

Independent Practice

35 When he reached the town gate but still could see nothing of the snail, the fox turned around and called out **tauntingly**, "Snail, pick up your pace! I can't wait months for you to get here!"

36 "I'm already here!" answered the snail. Without being seen, he had rolled out of the fox's tail and through the bottom of the gate.

37 Thus the fox had to admit it: Pride is no match for cleverness.

Comprehension Check

MORE ONLINE **sadlierconnect.com**

1. Compare what you read about patterns in traditional literature with what you have seen in "Finn MacCool and Oonagh" and "The Fox and the Snail." What similar pattern of events do these stories share?

a. They both have unusual characters.

b. They both have simple plots and a clearly stated moral.

c. They both deal with a trick that is played on a strong opponent.

d. They both deal with the pattern of the quest, or journey.

2. Which word best describes both Oonagh and the snail?

a. proud

b. intelligent

c. gloomy

d. honest

3. How are the themes of the folk tale about Finn MacCool and this animal fable similar? How are they different? Be sure to discuss the moral of each story.

Pecos Bill and Slue-Foot Sue

(Genre: Tall Tale/Legend)

1 Maybe you've heard of Pecos Bill. He was the roughest, toughest fella who ever lived in the American Wild West. Legend has it that Pecos Bill was born around the time that Texas was discovered, which was in the early 1830s.

2 Even as a boy, Bill showed he was a tough kid when he brought home a bear as a playmate. His mother could only roll her eyes and smile. She was a tough woman herself: She was sturdy and strict, and she wasn't afraid to fight off big snakes with her broom handle.

3 Bill's family moved farther west when he was a boy. During the journey, their wagon crossed the Pecos River and Bill fell out; but because Bill had sixteen brothers and sisters, no one noticed that he was missing.

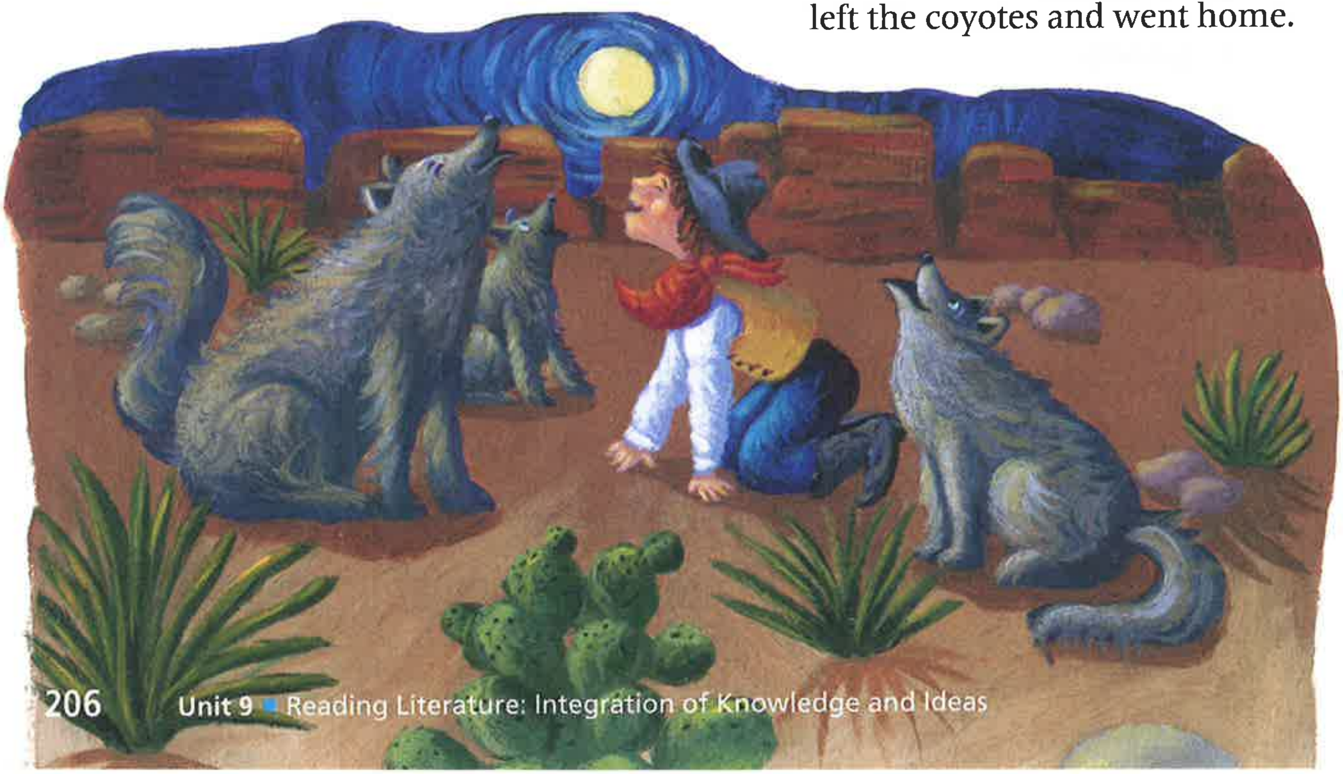
4 Bill watched the wagon ride off into the distance. But he wasn't sad; he just shrugged and started to walk. After a while, he met a mother coyote who offered to take him in and raise him as her own. Bill gladly accepted.

5 As a member of the pack, Bill learned to do many things. He yipped and yelped at the moon, scratched his itchy fleas, and learned to hunt.

6 One day, when Bill was a teenager, a cowhand came along and, upon seeing Bill, froze in his tracks. It was one of Bill's long-lost brothers. Bill said to him that it was impossible for them to be related—he was a coyote!

7 "That's nonsense," his brother replied, "for you don't have a tail!"

8 Since Bill's brother had a point, Bill left the coyotes and went home.



9 Reunited with his family, Bill learned to live the life of a cowhand. His brother taught him many new skills, and soon enough Bill showed extraordinary abilities. He taught broncos how to buck, and he invented the branding iron and cattle roping. He also invented the tarantula and the centipede—just so he could have something to fool his pals with. In his spare time, he dug the Rio Grande. He just always kept busy.

10 The day came when Bill needed new challenges, so he said goodbye to his family and set out, atop his horse, on his own.

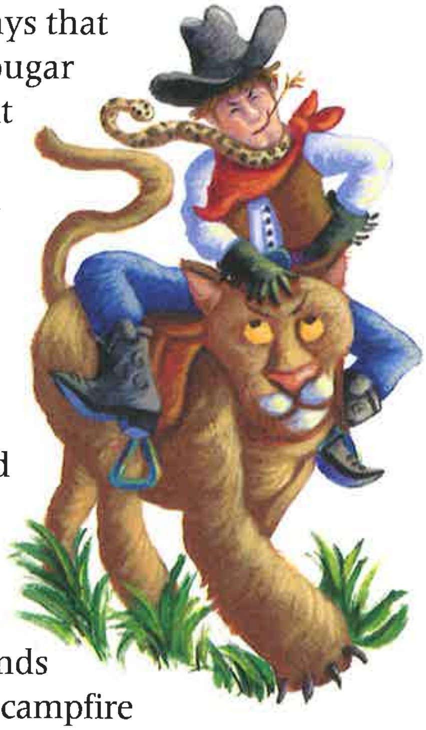
11 Bill came upon a trapper one day and asked him where the toughest men resided, for he wanted to live among them. The trapper was hesitant to reply, so Bill glared at him until he spilled the beans.

12 "Go farther west," the trapper said. So Bill did just that.

13 He galloped along on his horse for many days until one day, when the animal bruised her hoof and could not go any farther. Once more, Bill was on his own, but it didn't bother him.

14 Bill grabbed the saddle and walked for miles until he came upon a large rattlesnake, who hissed at him threateningly and reared up. Bill yawned and allowed the snake three bites before wrestling it to the ground.

15 The snake cried for mercy, and Bill let go. Then Bill met a cougar that looked as if it weighed a ton. As he did with the snake, Bill humored the animal, wrestling it to the ground and chuckling to himself as he did it. Legend says that the fur of the cougar flew so high that it made a cloud that blocked out the sun. Bill slapped his saddle on the cougar, threw the snake over his shoulder, and rode off.



16 That evening he came upon a group of cowhands sitting around a campfire and looking mighty tough and mean. They eyed him suspiciously, even though he was riding an enormous cougar and carrying a rattlesnake.

17 Bill—not being able to help who he was—grabbed their pot of hot coffee and drank it down in one gulp. Then he downed a kettle full of beans and washed them down with another pot of coffee. The leader of the lot stood up, eyed Bill, and said, "Stranger, I was the boss here; but you're the boss now."

18 Bill stayed with the cowhands and learned that he now was in Arizona. The first thing he did was find a new horse, Widowmaker. He fed her sticks of dynamite until she was strong and feisty enough for him to ride.

19 One day, a raging tornado came barreling across the land. It was as wide as a state and as loud as ten thousand freight trains. A more terrible tornado had never been seen, everyone agreed.

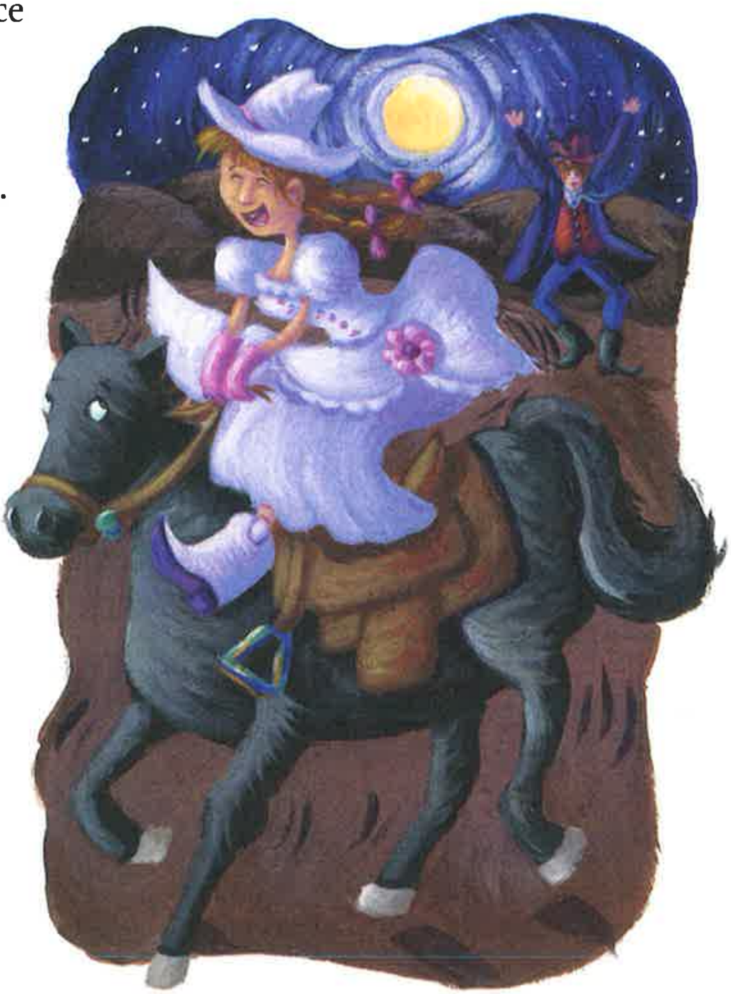
20 Bill took one look at that tornado and knew that he could tame it. Just as it came roaring toward him, he leaped on top of it, riding it like a bucking bronco. His big hat flopped in the fierce winds, but Bill never let go. He rode that storm for miles across Arizona until finally it dissolved into rain, washing out the entire Grand Canyon. As the storm broke down, it tossed Pecos Bill off like a sack of potatoes, and his hard landing in the southern California desert created Death Valley.

21 Pecos Bill was not alone his entire life. He did meet a special gal named Slue-Foot Sue. Sue was no slouch of a rider herself; in fact, she had a reputation for being able to stay on the most spirited bronco.

22 When Bill first set eyes on Sue, he instantly fell in love—and she felt the same way. They were two of a kind, and they were meant to be together.

23 Bill was a unique guy, but Sue had her own peculiarities. One of them was that she loved riding giant catfish—as big as whales—down the Rio Grande.

24 Something else that Sue loved was Widowmaker, Bill's horse. On their wedding day, Sue—still wearing her wedding dress—climbed onto Widowmaker and rode her for hours. Sue's wedding dress had a springy bustle in the back, so as she rode, she bounced. Unfortunately, she kept bouncing and couldn't stop. Finally, Bill had to knock her down out of the sky so she could get something to eat!



25 For all his toughness, Pecos Bill was really a pretty nice guy.

26 Once, a cowhand who was riding Widowmaker was tossed so high that he landed on the top of Pikes Peak in Colorado. Bill rescued the man by roping him around the shoulders and dragging him down the mountain.

27 There was another story about a new fence. Holes in the ground were needed to secure the fence, so Bill had an idea: He asked the prairie dogs in the area if they would like to dig the holes.

28 The prairie dogs loved being helpful, and the men loved not having to do the tedious work of digging the holes. Who but Bill would care what a prairie dog liked or how it felt?

29 Just how Pecos Bill died is a mystery. Cowhands tell various tales, but the most widely believed story is that Bill (who, don't forget, was the roughest, toughest fella in the West, and maybe anywhere) loved stirring nails, fishhooks, and barbed wire into his food for added flavor and texture. All those nails and whatnot rusted inside of him and eventually killed him, which is what bad habits can do.

30 Pecos Bill was mourned, but he was never forgotten.

Comprehension Check

1. The legend of Pecos Bill is called a tall tale. One topic in many legends is telling the origin of something in nature. According to this legend, Bill created Death Valley. What other origin tale have you read in this unit?

a. how Pecos Bill created Pikes Peak in this tall tale

b. why the snake sheds its skin in the legend of Gilgamesh

c. how the snail won the race in the Swiss fable

d. why griddle cakes are made with iron in the Irish folk tale

2. The relationship between Pecos Bill and Slue-Foot Sue is most like which other relationship that you have read about in this unit?

a. Gilgamesh and Ishtar

b. Finn MacCool and Cucullin

c. Finn MacCool and Oonagh

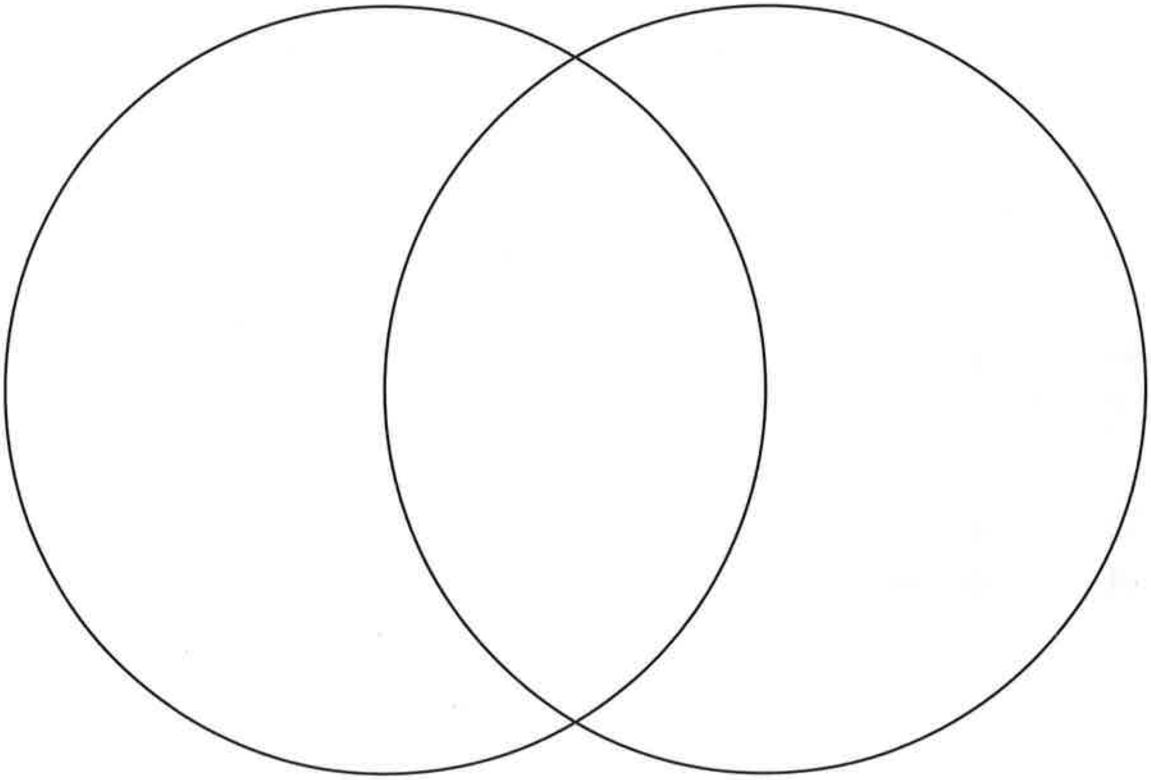
d. the fox and the snail

3. Review the visuals that go along with this story. Identify some details from the visuals that connect with text details. Then tell how the visuals help you better understand and enjoy the story.

4. Think about "Pecos Bill and Slue-Foot Sue" and "Finn MacCool and Oonagh." How are these stories similar? How are they different? Consider the characteristics of traditional literature, and be sure to cite specifics from the text in your answer.

Compare and Contrast Texts

In this unit, you read different kinds of stories from traditional literature. Think about the ways in which these stories are similar and different. Then use the Venn diagram below to compare and contrast two of the stories. List key details and important points from the texts to show the similarities and differences between them. Be prepared to discuss your ideas with your class.



Return to the Essential Question

What can readers learn by making connections between literary works?

In small groups or as a class, discuss the Essential Question. Think about what you have learned from comparing these works' themes, morals, and common patterns. Use evidence from the three texts to answer the question.

Idioms, Adages, and Proverbs

Guided Instruction Works of traditional literature sometimes use special expressions such as idioms or proverbs to help tell their stories. An **idiom** is a common everyday expression whose meaning is different from the literal meaning of its words. For example, when the snail tells the fox, "You're on!" he is using an idiom that means "I agree."

A **proverb** (sometimes called an **adage**) is a short statement or saying that expresses a common truth. A fable's moral or lesson is often stated as a proverb. For example, the moral of the famous story "The Tortoise and the Hare" is stated in the proverb "Slow and steady wins the race." In "Finn MacCool and Oonagh," the proverb "Brains are better than brawn" states the moral of the story.

Guided Practice Write whether each expression is an *idiom* or a *proverb*. Remember that an idiom is an everyday expression and a proverb is a short saying that states a truth or gives advice.

1. "the early bird gets the worm" ____________________
2. "hit the road" ____________________
3. "piece of cake" ____________________
4. "look before you leap" ____________________
5. "washed them down" ____________________

Independent Practice Rewrite these statements from "Finn MacCool and Oonagh" in your own words.

1. Brains are better than brawn. (proverb)

____

____

2. Yet there was a method to Finn's madness. . . . (idiom)

____

____

UNIT 9 REVIEW

Read the following two works of traditional literature. Think about what they have in common with other traditional stories. Then answer the questions on pages 213 and 214.

The Mother and the Wolf

(Genre: Aesop's Fable)

1 A famished Wolf was prowling outside a cottage when he heard a Child weeping inside; then he heard the Mother say, "Stop crying, Child, or I will give you to the Wolf!" The thought of such a wonderful gift caused the Wolf to wait there, under an open window, all day.

2 Toward nightfall, he heard the Mother's voice again: "Child, the Wolf shall not get you because Daddy will kill him if he should come near!" It was a bitter pill for the Wolf to swallow.

3 So, do not believe everything you hear.

The Hawk and the Squirrel

(Genre: Filipino Folk Tale)

4 Hawk sat in a tree, eating a salty fish, while hungry Squirrel spied the scene from below and then called out, "Hawk! Sing to me with your voice so soft and sweet!"

5 Filled with pride, Hawk began to sing, and the fish fell to the ground. Adding insult to injury, Squirrel grabbed it and ran away. Do not always believe what others tell you.

Fill in the circle of the correct answer choice.

1. Which of these is a moral?
   - ○ ...the Wolf shall not get you...
   - ○ . . . it was a bitter pill. . . .
   - ○ . . . Squirrel grabbed it and ran away.
   - ○ So, do not believe everything you hear.

2. What does the idiom *adding insult to injury* mean?
   - ○ causing harm to someone
   - ○ saying something cruel
   - ○ making the situation worse
   - ○ winning the victory

UNIT 9 REVIEW

3. Which characters are defeated by trickery in these tales?

○ Wolf and Hawk
○ Squirrel and Mother
○ Mother and Child
○ Hawk and Squirrel

4. Which characteristic of traditional literature appears in both tales?

○ A character goes on a quest.
○ The characters do strange things.
○ The stories take place long ago.
○ There is a clearly stated moral.

5. Underline the name of the character who is the villain in the first story.

6. Circle the theme, or moral, of the second story.

7. What is one way that you can tell the second story is traditional literature?

____

____

8. Which character in the second tale is like the Mother in the first tale? Why?

____

____

9. Suppose that you could represent the second story with just one picture. What would the picture be? Why?

____

____

____

10. How are the themes, or morals, of the two stories similar and different? Explain.

____

____

____

Introducing UNIT 10

In this unit about scientific quests for knowledge, you will learn how to write a research report, a type of informative or explanatory text based on evidence.

Before writing a research report, you must choose a topic and gather information about it. When writing, you use the evidence you gathered to support your ideas about the topic. Even though you are writing about facts, you want your research report to be interesting and believable. So, you cite relevant evidence from both print and digital sources.

To be effective, a research report must be well organized, grouping related information in sections. Summaries and explanations of events should be clear and concise, and the writing should be grammatically correct, with correct capitalization and spelling. The report should end with a list of sources.

Progress Check *Can I?*

Before Unit 10		After Unit 10
☐	Write a research report that investigates a topic.	☐
☐	Gather relevant evidence from print and digital sources.	☐
☐	Take notes and organize the information logically.	☐
☐	Present the information in a way that builds knowledge.	☐
☐	Provide a list of sources.	☐
☐	Write using commas in compound sentences correctly.	☐
☐	Write using correct capitalization.	☐
☐	Write using correct spelling.	☐

HOME ◆ CONNECT...

In this unit, children will learn about writing a **research report**. A research report is a type of text that explains or informs. Explain to your child that it tells the reader about a topic that the writer has researched—that is, a topic about which the writer has **gathered facts and evidence**. Point out that a research report can be about a science topic, a social studies topic, a famous person, or any other topic that interests a writer.

Guide your child as he or she practices researching a topic, using both **print and digital sources**. Encourage your child to write down facts and evidence about a specific topic in a chart or on note cards. Help your child **categorize the evidence** by color-coding the chart or grouping the note cards. Explain that he or she needs to **include source information** for each fact or piece of evidence collected. Source information includes the title of the source, the author, the publication, and the date published.

Conversation Starter: Explain to your child that researching a topic and writing a report about it is not just a challenge; it is an opportunity to build knowledge on the topic. Ask: *What topic do you want to know more about? What do you think you can learn about the topic by researching it? Where can you find facts and evidence about the topic?*

IN THIS UNIT, YOUR CHILD WILL...

- Learn to write a research report that includes an introduction, develops subtopics with evidence, and ends with a concluding statement or section.
- Gather relevant information from relevant print and digital sources by taking notes and categorizing the information.
- Learn specific language skills and apply them:
  - Use commas correctly in compound sentences.
  - Use correct capitalization.
  - Correctly spell frequently misspelled words.
  - Consult a dictionary for the correct spelling of a word.

WAYS TO HELP YOUR CHILD

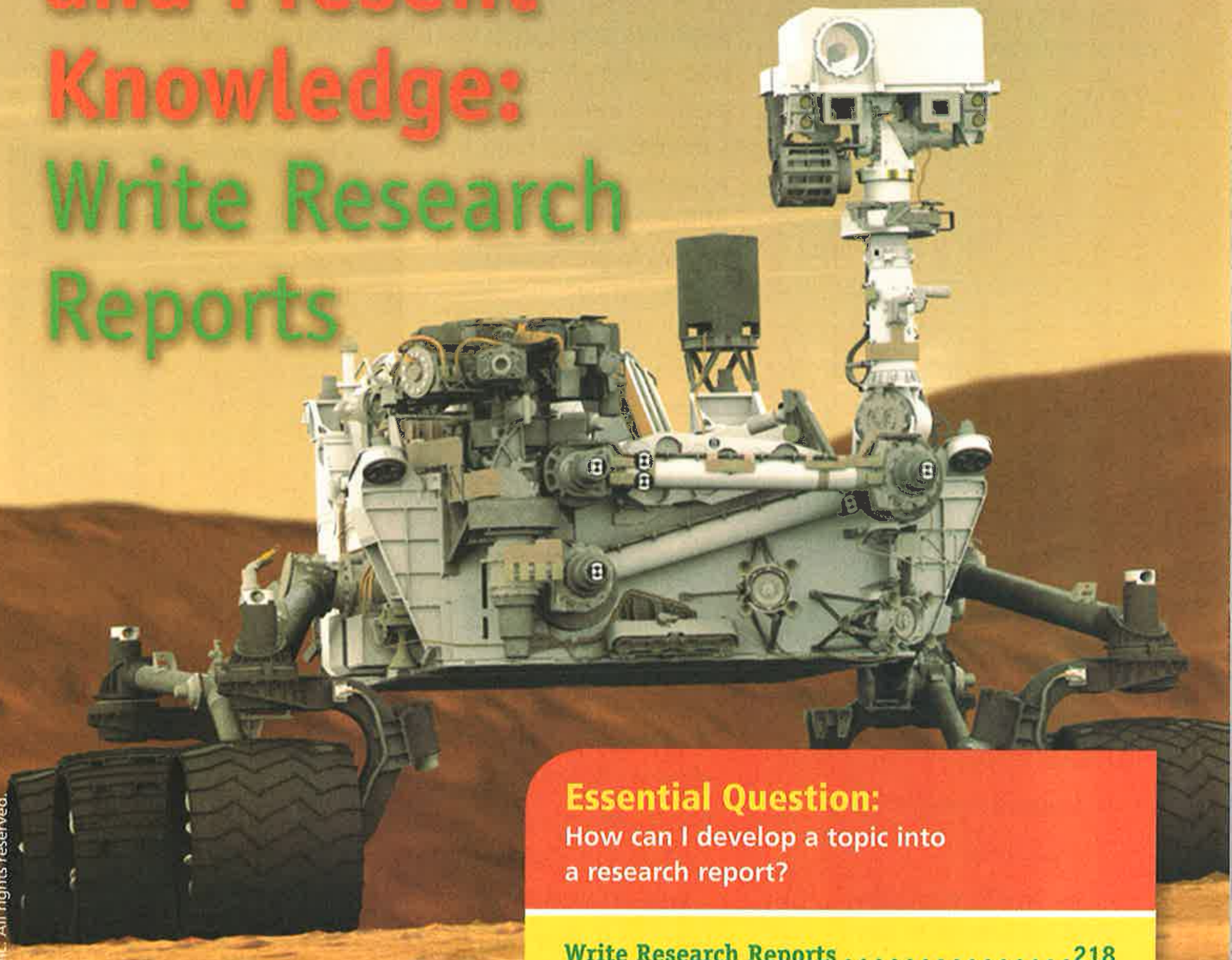
Remind your child that it is important to use credible, or trustworthy, sources when doing research. Point out that Internet sites with URLs that end in .edu (education websites) and .gov (government websites) are usually credible sources. Information found at a .com website, however, is not always credible, so it should be verified by another source.

ONLINE

For more Home Connect activities, continue online at sadlierconnect.com

UNIT 10

Research to Build and Present Knowledge: Write Research Reports



Essential Question:
How can I develop a topic into a research report?

Write Research Reports 218
Language: Commas in Compound Sentences.................... 223
Language: Capitalization 224
Language: Spelling 225
Speaking and Listening................ 226
Unit 10 Review 227

Read a Student Model

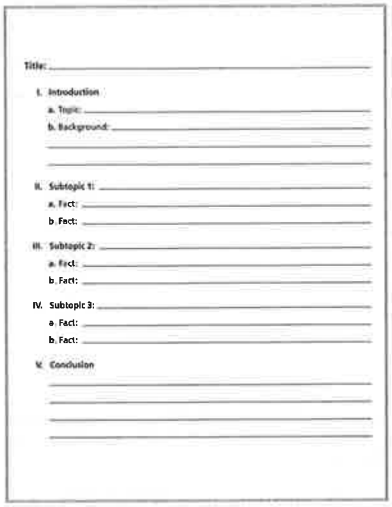
Marcus is a student in Ms. Hanson's fourth-grade class. He has been asked to write a research report on a scientific quest. A quest is an exploration in search of knowledge. Marcus must gather, summarize, and explain relevant information from both print and digital sources. As you read his research report, think about what you will research and how you will organize, summarize, and explain the information you gather for your own research report about a real-life quest.

Exploring Mars

The planet Mars is millions of miles away from Earth. Yet, in their quest for knowledge about the planet, scientists on Earth are able to explore Mars. They do so through remote-controlled rovers. The most recent rover sent to Mars is called Curiosity. Like other rovers, Curiosity has no people on board. Scientists control it from Earth. The National Aeronautics and Space Administration (NASA) launched Curiosity on November 26, 2011. The rover landed on Mars on August 6, 2012. NASA is exploring Mars for several reasons: to learn if life ever existed on Mars, to learn more about the planet's atmosphere and geology, and to learn if people can be sent to Mars.

CREATING AN ORGANIZATIONAL STRUCTURE

Marcus used an outline to organize his research report. It has an introduction, three subtopic sections, and a conclusion.



Title:
I. Introduction
a. Topic:
b. Background:
II. Subtopic 1:
a. Fact:
b. Fact:
III. Subtopic 2:
a. Fact:
b. Fact:
IV. Subtopic 3:
a. Fact:
b. Fact:
V. Conclusion

TITLE

- Identifies the topic for the reader

INTRODUCTION

- Introduces the research topic
- Gives background
- States the different aspects of the topic the writer has investigated

Underline the sentence that states the different aspects of the topic the writer has investigated.

Signs of Water

Soon after landing on Mars, *Curiosity* filmed a dried-up streambed and detected clay minerals. Scientists wondered if these minerals could be from a dried-up lake. Based on these and other discoveries, NASA announced that Mars could have supported germ-like life long ago. The scientist in charge of the mission said, “We have found a habitable environment.”

Atmosphere and Geology

Curiosity has made several important findings about Mars’s atmosphere and geology, too. The rover collected data on radiation. Scientists concluded from the data that the radiation in Mars’s atmosphere is the same as that of the International Space Station. *Curiosity* also found oxygen, hydrogen, and carbon in a rock sample. These chemicals are also signs that Mars could have once supported life.

Humans on Mars

Curiosity has also helped NASA get closer to sending humans to Mars. NASA landed *Curiosity* on Mars with a crane that was attached to another spacecraft. Before this time, rovers were dropped on Mars. According to Rebecca Boyle of *Popular Science* magazine, previous rovers released airbags to land on. Then they bounced around. That sort of landing would be very hard on humans, but the crane-type landing is much smoother.

SUBTOPIC 1

- Group information related to one subtopic in one section.
- To build knowledge, Marcus has gathered relevant information from print and digital sources for each of his subtopics.
- He summarizes and explains the information he researched.

SUBTOPIC 2

Underline a sentence that states Marcus’s second subtopic.

Circle one piece of information that is relevant to Marcus’s analysis of this subtopic.

SUBTOPIC 3

Underline a sentence that states Marcus’s third subtopic.

Put a box around the information that Marcus uses to explain this subtopic.

WRITE RESEARCH REPORTS

CONCLUDING STATEMENT

Marcus's conclusion wraps up his research on the topic and makes a prediction based on evidence he has presented.

Underline the sentence that states the conclusion most clearly.

LIST OF SOURCES

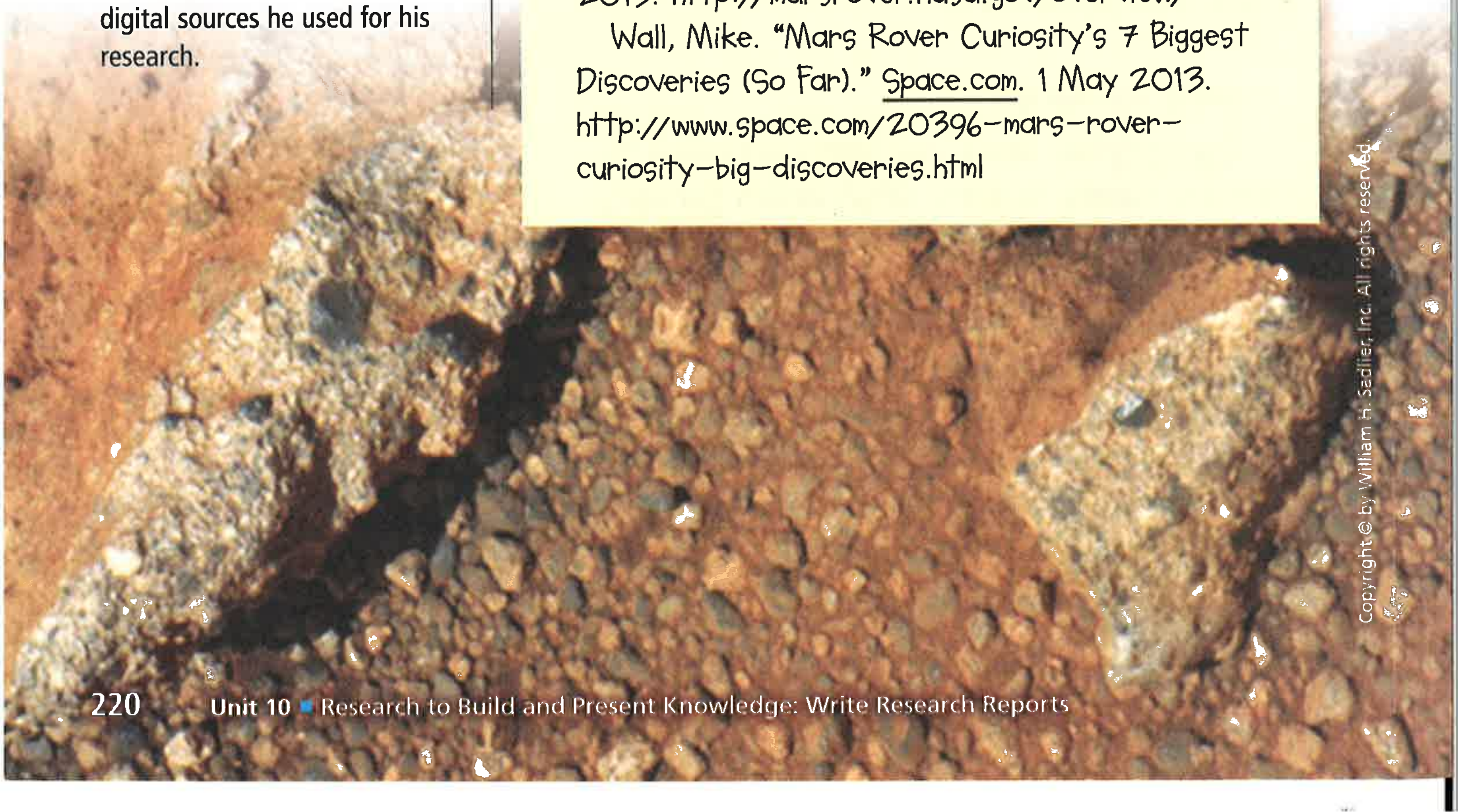
At the end of his report, Marcus provides a list of the digital sources he used for his research.

Depending on orbits, Mars is anywhere from 54.6 to 401 million kilometers away from Earth. No one has ever walked on Mars, and no spacecraft has ever traveled back to Earth from Mars. Yet, we have learned much about Mars from rovers. Curiosity, especially, has helped NASA gain valuable information about the possibility that life once existed on Mars. It has also gained data about the planet's atmosphere and geology. Rovers are helping scientists to determine whether humans could be sent to Mars. NASA scientists still have many questions, though. They are still very curious about what life forms might have existed on Mars. Curiosity will likely make many more discoveries that help satisfy NASA's quest for knowledge.

Sources:

"Mars Exploration Rovers." NASA.gov. 1 May 2013. http://marsrover.nasa.gov/overview/

Wall, Mike. "Mars Rover Curiosity's 7 Biggest Discoveries (So Far)." Space.com. 1 May 2013. http://www.space.com/20396-mars-rover-curiosity-big-discoveries.html



Use index cards like the ones below to take notes for your research report on a scientific quest. You may use print or digital sources to find information. You will use these notes to create your outline on page 222.

Source 1:

Summarize or paraphrase information:

Source 2:

Summarize or paraphrase information:

WRITE RESEARCH REPORTS

Use an outline to organize your research report about a real-life quest. Then write a first draft of your report on a separate sheet of paper. You should have gathered relevant information from print and digital sources and made notes beforehand. You will use this draft to write your final research report in the Unit 10 Review section on page 228.

Title: ______________________________

I. Introduction

a. Topic: ______________________________

b. Background: ______________________________

____

____

II. Subtopic 1: ______________________________

a. Fact: ______________________________

b. Fact: ______________________________

III. Subtopic 2: ______________________________

a. Fact: ______________________________

b. Fact: ______________________________

IV. Subtopic 3: ______________________________

a. Fact: ______________________________

b. Fact: ______________________________

V. Conclusion

____

____

____

____

Commas in Compound Sentences

Guided Instruction A **compound sentence** consists of two independent clauses joined by a conjunction (*and, but, or, for, nor, so, yet*). The **comma** in a compound sentence is always placed before the conjunction.

- INCORRECT
  Ben put the dishes away ***and****, he swept the floor.*
- CORRECT
  Ben put the dishes away, ***and*** *he swept the floor.*

Guided Practice Complete each sentence using the conjunction given at the end of the sentence. Add a comma in the correct place.

1. We have math homework ____________ we have a spelling worksheet. (and)
2. Kayla can play shortstop ____________ she can pitch. (or)
3. Max likes the ocean ____________ he does not like lakes. (but)
4. The cars made a lot of noise ____________we shut the window. (so)

Independent Practice Write three of your own compound sentences using the conjunction given. Be sure to place the comma correctly.

1. and

____

____

2. or

____

____

3. so

____

____

Capitalization

Guided Instruction Always begin a sentence with a **capital letter**. Capitalize the first letter of titles, names, proper nouns, and quotations as well.

- *__E__veryone is excited about the field trip to the __A__ncient __A__rts __M__useum.*
- *__M__s. __B__atra teaches at __C__entral __M__iddle __S__chool.*
- *__O__ur teacher said, "__L__ine up for recess."*

Guided Practice Correct the capitalization errors in each sentence.

1. anne and margot, characters in the play the diary of anne frank, are sisters.

____

____

2. dr. hugh samuels works at springfield hospital on overton avenue.

____

3. coach walton shouted to the receiver, "run to the end zone!" as the fans in heinz stadium rose to their feet.

____

____

Independent Practice Write three of your own sentences using correct capitalization. Include proper nouns in each sentence. At least one sentence should include a title, and one sentence should include a quotation.

1. ______________________________

____

2. ______________________________

____

3. ______________________________

____

Spelling

Guided Instruction A number of words in the English language may be misspelled quite often. Pay extra attention to these words, and spell them correctly when you write. When you are unsure of how to spell a word, look it up in a dictionary.

Frequently Misspelled Words		
business	familiar	opposite
committee	favorite	particular
disease	interrupt	realize
especially	lightning	scissors
experience	necessary	strengthen

Guided Practice Circle the correct spelling of the word in parentheses.

1. The rainstorm brought thunder and (lightening, lightning).
2. It is (neccesarry, necessary) to take cover during bad weather.
3. The (committee, comittee) will make the decision.
4. What is your (faverit, favorite) book?
5. She set up her (bizness, business) in the new office building.

Independent Practice Find each misspelled word and spell it correctly on the line.

1. Did you relize that you were late?

____

2. Never run when you are carrying sizzers.

____

3. He is espeshully tired today.

____

4. It is rude to inturupt when someone else is talking.

____

SPEAKING AND LISTENING

Discuss the Essential Question

How can I develop a topic into a research report?

Think about the Essential Question by responding to the questions below. Support your point of view with reasons and facts.

1. How does the exploration of Mars with the rover qualify as a quest?

2. What relevant information did the writer include in the report?

Use your notes above to discuss the Essential Question in small groups or as a class. Follow agreed-upon rules for discussion. Use the organizer below to record what you heard and how you participated.

Ideas I Agree or Disagree With		Questions I Asked
Agree		
Disagree		
New Ideas I Had During Discussion		Questions I Answered

UNIT 10 REVIEW

This paragraph has mistakes in comma usage, capitalization, and spelling. Write the paragraph correctly on the lines below.

My favrite book, shipwreck at the bottom of the world by jennifer armstrong, is about ernest shackleton. He was a famous explorer of antarctica. shackleton was not the first person too reach the south pole but, he and his team were the first to climb Mount erebus on Antarctica. In 1911, Shackleton's ship, the endurance, got stuck in the ice and sank. not a single member of it's crew died. Shackleton later wrote a book about there experiance and, he became even more famous.

UNIT 10 REVIEW

Assignment: Write a research report about a real-life quest.

On the lines below, write the final copy of the research report draft you created on page 222. Be sure to tell what real-life quest you are writing about and to identify the different aspects of the topic you are covering. Group related information together, and provide a list of sources. See the Writing Handbook (pages 275–283) for ways to improve your writing as you revise.

Introducing UNIT 11

In this unit about amazing discoveries, you will learn how knowledge and ideas work together, or integrate, in informational texts. Authors of informational texts often include visuals, such as charts, diagrams, graphs, and time lines. These visual elements are important tools that can help you more easily visualize and understand technical and scientific topics.

Authors of informational texts must also give reasons and evidence to support the points they make. In technical texts, reasons and evidence often take the form of data. *Data* are facts that can be proven through observation and measurement. It is your job as a reader to determine whether the reasons and evidence that an author provides are strong enough to support the points that he or she is making.

In this unit, you also will learn how to interpret information from two texts on the same topic, putting information together in order to gain greater knowledge of the subject. You also will learn how Greek and Latin roots can help you understand the meanings of words used in scientific and technical texts.

Progress Check Can I?

Before Unit 11		After Unit 11
☐	Interpret visual information and explain how it helps me understand a text.	☐
☐	Explain how an author uses reasons and evidence to support his or her ideas.	☐
☐	Gather and put together information by reading two texts on the same topic.	☐
☐	Use Greek and Latin roots to help me understand the meaning of words.	☐

HOME✦CONNECT...

Nonfiction texts often include **illustrations and other text features**, such as subheadings, captions, and graphs. Ask your child to point out examples in his or her textbooks and to explain how each example makes the text easier to understand.

Authors of nonfiction texts provide **reasons and evidence** to support their ideas. With your child, select an interesting nonfiction text from a book, magazine, newspaper, or website. Read it together and call attention to the reasons and evidence that support the author's main points. Discuss with your child which reasons and evidence are strongest and weakest.

When your child reads a variety of texts on a topic he or she enjoys, he or she can **integrate information**, or put the facts from different texts together, to speak knowledgeably about the topic. Ask your child to share with you what he or she has been learning recently by reading various accounts of a favorite topic.

Activity: With your child, use the Internet to search for reliable texts about an amazing discovery or other scientific topic of interest. Print two articles about the topic and read them aloud together. Look for text features, such as diagrams, headings, and captions. Discuss the reasons and evidence the author uses. Talk about information the texts have in common. Then ask your child to tell you about the subject in his or her own words, integrating what he or she has learned.

IN THIS UNIT, YOUR CHILD WILL...

- Interpret visual information and other text features in a technical or scientific text.
- Analyze and explain how an author uses reasons and evidence to support his or her ideas.
- Integrate what he or she learns about a subject from two texts and then speak knowledgeably about the information.
- Use common Greek and Latin roots to help define unfamiliar words.
- Compare and contrast four texts on the same theme: a technical text with illustrations, a technical text with diagrams, a paired blog and Internet advertisement, and a paired scientific journal entry and newspaper article.

WAYS TO HELP YOUR CHILD

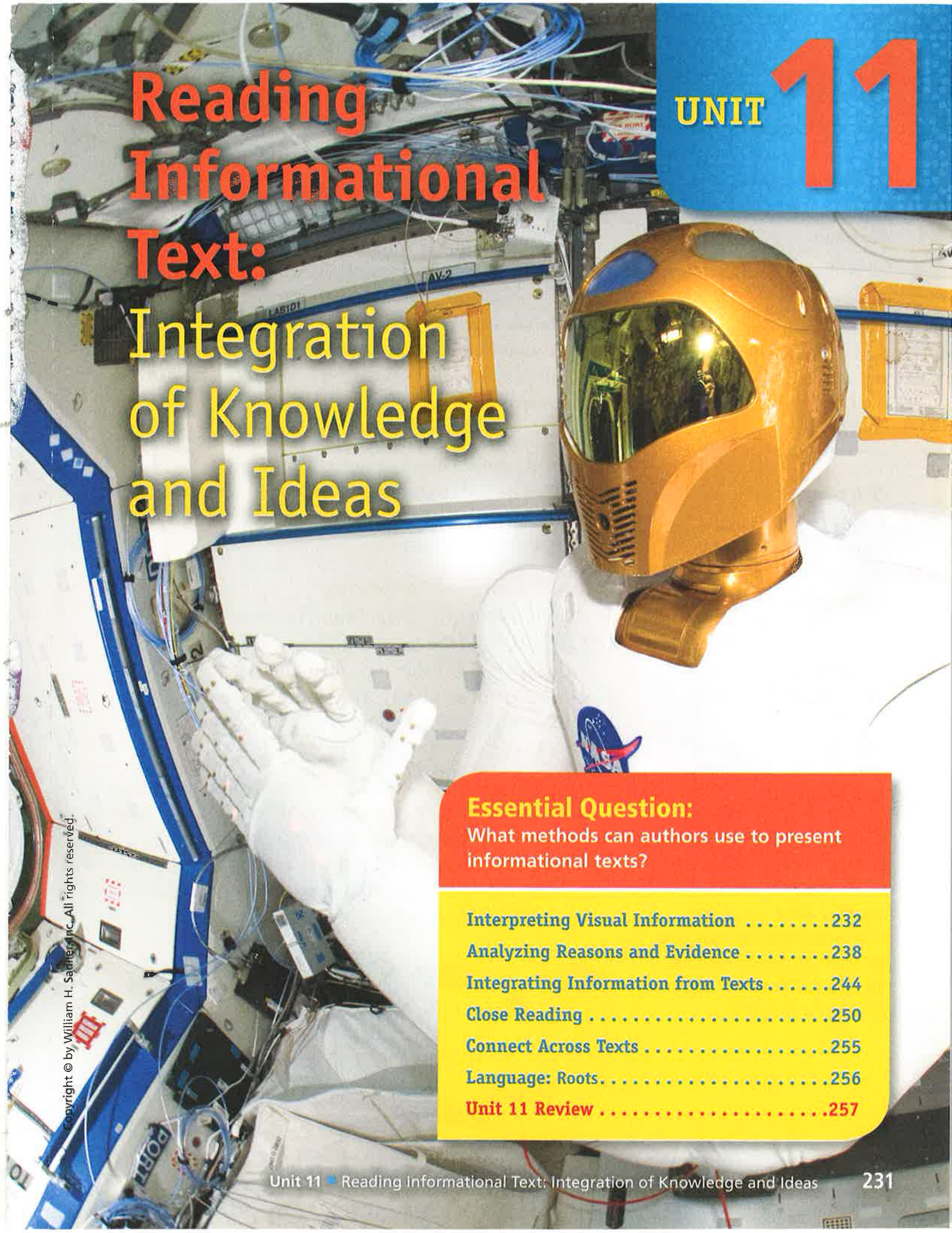
Encourage your child's growing ability to speak knowledgeably about topics he or she enjoys. Share information about your favorite topics, as well. Talk about the ways you learn new information about your favorite topics. Encourage your child to read about topics that interest him or her and to teach you what he or she learns.

ONLINE

For more Home Connect activities, continue online at sadlierconnect.com

UNIT 11

Reading Informational Text: Integration of Knowledge and Ideas



Essential Question:

What methods can authors use to present informational texts?

Interpreting Visual Information 232
Analyzing Reasons and Evidence 238
Integrating Information from Texts 244
Close Reading 250
Connect Across Texts 255
Language: Roots.....................256
Unit 11 Review 257

INTERPRETING VISUAL INFORMATION

Guided Instruction

WORDS TO KNOW

data
equipped
satellite

Informational text often presents **visual information** in diagrams, charts, photos, and time lines that must be **interpreted**.

CITE EVIDENCE

A To **interpret visual information,** you need to understand how the information is being presented. The time line shows satellites launched between 1957 and 2000, with years listed in ten-year spans. A line leads from each satellite to the time of its launch. Circle the part of the time line that shows when *Explorer I* was launched. What year is this?

B Visuals may restate ideas in the text. In the text, underline the year *Sputnik I* was launched. Put a star at that date on the time line. How does the time line visually reinforce the idea that *Explorer I* was a response to *Sputnik I*?

Satellites Around Earth

(Genre: Technical Text)

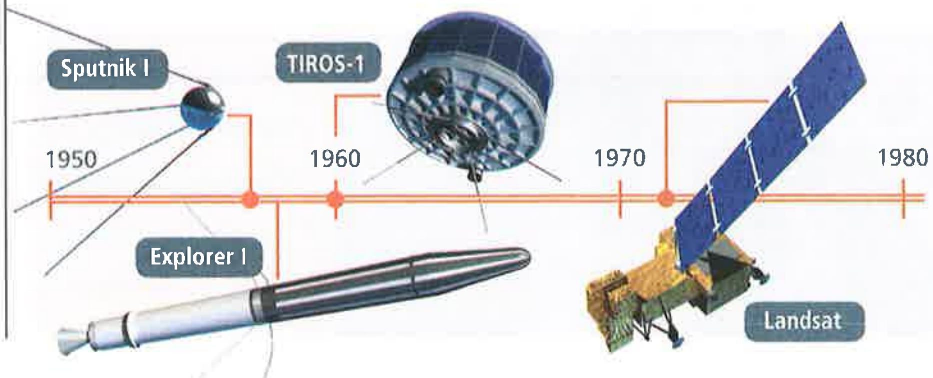
1 Look up at the stars on a clear night. If you see a speck of light moving across the sky, you are not looking at a star. Chances are that you are looking at a **satellite**. A satellite is anything that orbits our planet. The moon is a natural satellite. But high above Earth, thousands of satellites made and launched by people are orbiting at this very moment.

2 Satellites serve many purposes. Mostly, they collect scientific **data**. They can gather information on the weather or on big changes in the environment. Some of them even carry large telescopes that can see galaxies many light-years away.

The History of Satellites

3 In the 1950s, the Soviet Union (a group of countries that arose from the former Russian Empire) sent an artificial satellite called *Sputnik I* into space. It went into orbit on October 4, 1957. The United States soon began a "space race" with the Soviet Union by launching a satellite of its own, called *Explorer I*.

4 Both of these early satellites were small metal globes **equipped** with batteries, thermometers, and antennae. They were designed to record scientific data, such as radio waves. *Sputnik* and *Explorer* created an interest in—and a need for—satellite technology that has only increased in the decades since then.



INTEGRATION OF KNOWLEDGE AND IDEAS

5 After *Explorer I*, the United States launched *TIROS-1*, the first satellite that gathered information about weather. Then came three *Landsat* (short for "land satellite") satellites, the first of which was launched in 1972. These satellites were designed to study how our world changes. Much of what we know about climate change and urban growth comes from *Landsat* data.

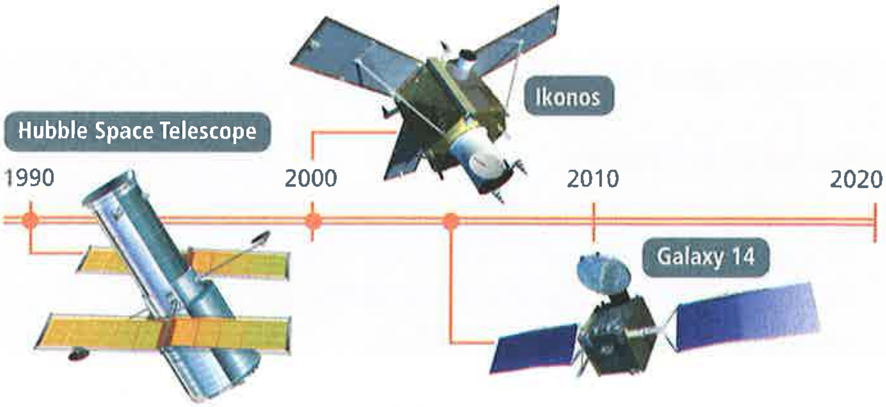
6 The launch of the Hubble Space Telescope in 1990 was a major scientific event. Never before had people been able to see such clear images of distant objects in deep space. The Hubble will continue to orbit Earth until 2015.

7 *Ikonos* is an incredibly powerful imaging satellite. An imaging satellite can record images using different parts of the electromagnetic spectrum that humans cannot see. (Regular photographs use only visible light.) Launched in 1999, *Ikonos* offers high-definition pictures of objects on our planet's surface.

8 Many satellites that orbit Earth today deliver media to consumers instantly. Have you ever listened to satellite radio? Think about an international sporting event, like the Olympics. Images from such events probably were sent to you from a satellite like the *Galaxy 14*.

Comprehension Check

How does the time line help the reader understand the importance of satellites?



Guided Instruction

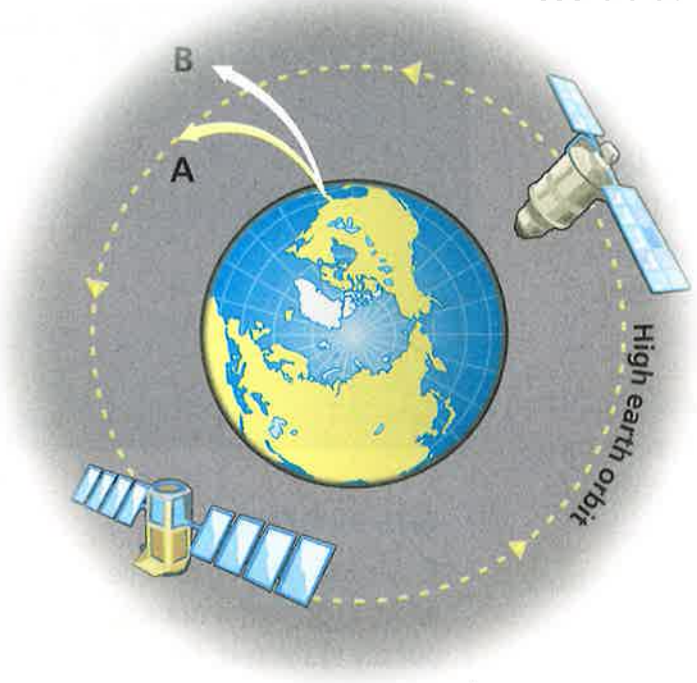
CITE EVIDENCE

C Visuals can also provide information that is not stated directly in the text. On the time line, put a box around the year *TIROS-1* was launched.

D Visual information helps you better understand a text. Read paragraph 8 and then box the spot on the time line that tells when *Galaxy 14* was launched. What year is this? What does the time line visually suggest about how television has changed since the first satellite was launched in 1957?

Satellites in Space

9 A satellite is usually launched into space on a rocket. When the space shuttle program was active, satellites could also be delivered into orbit by a space shuttle.



10 The rocket that launches a satellite must be very powerful, for satellites can be quite heavy. Some satellites weigh several tons! The rocket fires special engines called *boosters* to get it off the ground. Once in space, the rocket fires smaller rockets that tip it into place. Then the rocket releases the satellite into a circular orbit around Earth.

11 It is important to balance the speed of Earth's rotation with the satellite's motion. If the satellite moves too slowly, Earth's gravity will pull it down. That would be a disaster, for satellites are costly to produce and launch. Scientists devote many years to the development of just one satellite. What about the danger to people if a satellite falls? Fortunately, most pieces of a satellite would burn up in Earth's atmosphere before landing.

12 An **orbital velocity** is the speed at which a satellite needs to move in order to stay in a steady orbit around Earth. A satellite that is 150 miles above Earth should have an orbital velocity of about 17,000 miles per hour. The satellite must not go too fast, though. If it does, it can reach **escape velocity**. Escape velocity is the speed at which the satellite will break out of its orbit and shoot off into space.

Satellite Orbits

13 Satellites orbit our planet in different ways. A satellite in a geostationary orbit stays over the same spot on Earth at all times. This is the best kind of orbit for satellites that study the weather.

WORDS TO KNOW

escape velocity
orbital velocity

CITE EVIDENCE

A Circle the satellites shown in the diagram above.

B In paragraph 12, underline two terms that correspond to A and B in the diagram. What is the purpose of the diagram?

14 In the case of a polar orbit, a satellite traces a line past the North and South Poles. Earth rotates beneath this imaginary orbit. This kind of orbit is ideal for satellites used for mapping.

Comprehension Check

1. Which of the following terms from the text is NOT illustrated in the diagram on page 234?

a. orbital velocity

b. escape velocity

c. geostationary orbit

d. satellite

2. Which of the following best explains the meaning of *orbital velocity*?

a. the speed at which a satellite needs to move in order to stay in a steady orbit around Earth

b. an orbit in which a satellite stays over the same spot on Earth at all times

c. an orbit in which a satellite traces a line past the North and South Poles

d. the speed at which a satellite will break out of its orbit and shoot off into space

3. Work with a partner. Discuss how the diagram on page 234 helps you understand how satellites move in space. Cite details from the text in your answer.

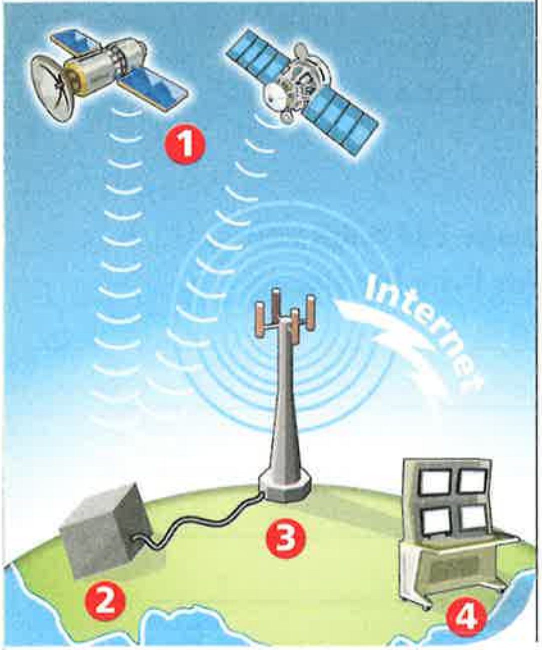
WORDS TO KNOW

calculate
innovative
range

CITE EVIDENCE

A The diagram on this page shows how GPS fleet technology works. Find and underline the text that corresponds to Step 3 in the diagram.

B In the GPS fleet diagram, put a box around the GPS satellites. How would a car with a built-in GPS differ from what the diagram shows?



Satellites Around Earth *continued*

How Far Above Earth?

15 As you have learned, satellites orbit many miles above Earth's surface. But there is a wide **range** in the height of these orbits.

16 The satellites that are closest orbit 80–1,200 miles above the surface. The *Landsat* satellites that do mapping are examples of relatively close satellites.

17 Farther away are scientific satellites that gather data on the environment. They orbit 3,000–6,000 miles above the surface. Next are satellites that help with navigation, such as GPS satellites. They are 6,000–12,000 miles away.

18 Farthest away, at more than 22,000 miles, are satellites that tell us about the weather and that help with communication, such as television and radio satellites.

GPS Satellites

19 Among the most **innovative** satellites are the GPS (Global Positioning System) satellites. The U.S. government originally designed them for military use. GPS technology is now used by many people to help with mapping locations.

20 GPS technology starts with a series of 24–32 satellites. These satellites communicate with devices on the ground called GPS receivers. The receivers exchange radio signals with at least three GPS satellites. First, the receivers **calculate** how long it takes the signals to reach the satellites. Then they measure their distance to the satellites. The receivers collect this data and use it to determine an exact location.

21 Today, GPS receivers are built into cars and smartphones. Some companies use GPS to track an entire fleet of vehicles. In this case, the GPS receivers' location data is sent to a cellular phone network. The network then sends the information, via the Internet, to computers.

22 The computers that receive this information have software that can assemble the location data. For example, a police department might have a special bank of computers using GPS to track its police cars. A trucking company might use GPS to locate its trucks as they deliver shipments.

23 GPS technology is just one of the many ways that artificial satellites are being used to make life better in today's world.

Comprehension Check

MORE ONLINE **sadlierconnect.com**

1. Which of the following does Step 2 in the diagram on page 236 represent?

a. the Internet

b. GPS satellites

c. a GPS receiver

d. a bank of computers

2. Suppose that the diagram showed a smartphone with a built-in GPS. Where in the diagram would the smartphone appear?

a. Step 1

b. Step 2

c. Step 3

d. Step 4

3. How does the diagram on page 236 help the reader understand the text description of how GPS fleet technology works?

____

____

____

____

ANALYZING REASONS AND EVIDENCE

Guided Instruction

WORDS TO KNOW

converted
electromagnetic spectrum
neutralize
refracted

An author uses **reasons and evidence** to support the particular points he or she makes in a text.

CITE EVIDENCE

A **Evidence** for ideas can appear as words or as images. For example, in paragraph 2, the idea that there are different kinds of energy waves is supported by the diagram. Put a star by the section of the diagram that shows the range of visible light.

B In paragraph 3, underline the names of the four devices that are used as evidence to support the idea that machines have been built to use the invisible waves in the electromagnetic spectrum. How are these machines useful to people? What would change if they had never been invented?

Becoming Invisible:

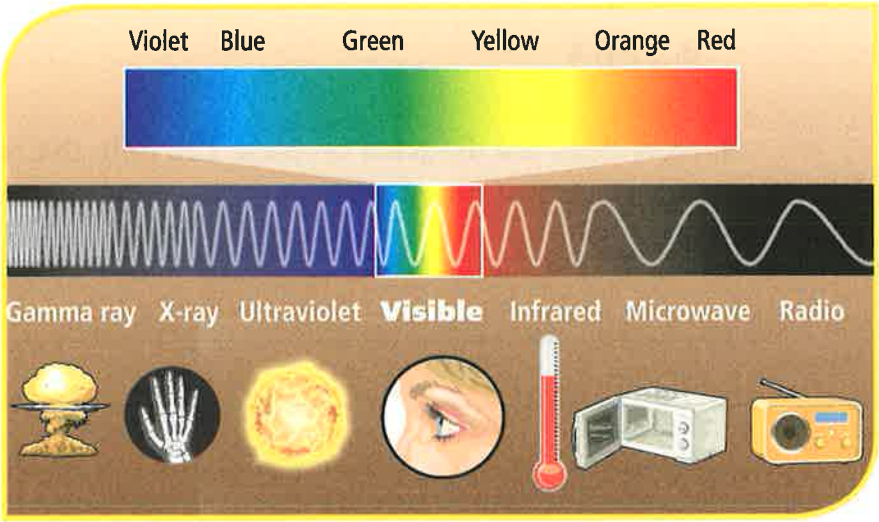
Fantasy or Fact?

(Genre: Technical Text)

1 Have you ever imagined what it would be like to become invisible? It's just a fantasy, right? Actually, invisibility is not totally impossible; in fact, scientists are conducting experiments today to see how to make people, objects, and even buildings and vehicles invisible!

How We See

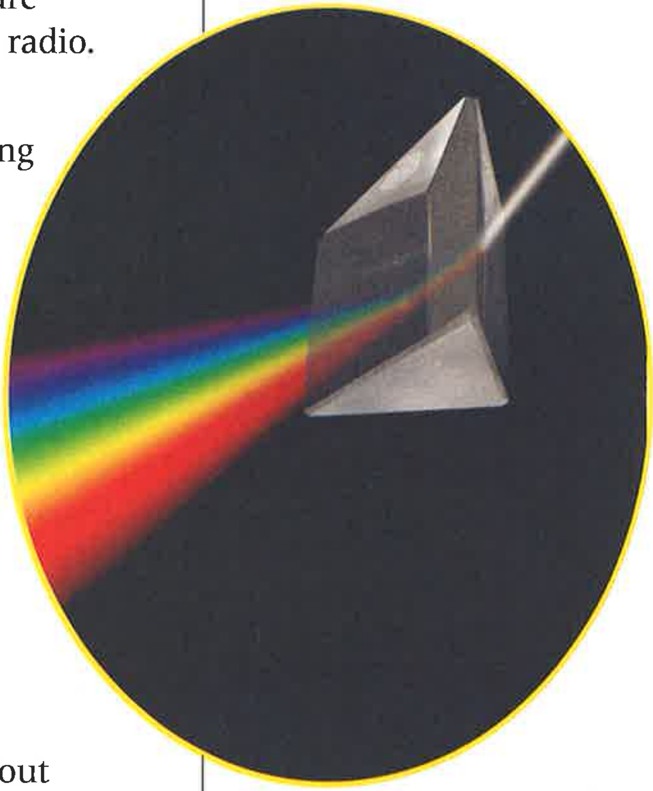
2 The science of invisibility begins with understanding how we see. When we look at something, we are not seeing the actual object. Instead, we are seeing the light that reflects off of the object. Light is a kind of energy that is made up of waves. There are many different kinds of waves that make up the **electromagnetic spectrum.** Although the human eye can see only the waves that are in the "visible light" range of the spectrum, certain animals can see, or sense, other parts of the electromagnetic spectrum. Rattlesnakes, for example, can "see" infrared light, and bees can sense ultraviolet light.



Guided Instruction

3 People have invented machines to use the waves on the spectrum that we cannot see. A microwave oven uses microwaves to heat food. X-ray machines are used to photograph a person's bones. Radio waves are **converted** into sound—music or voices—by a radio. Cell phone signals are also on the spectrum.

4 Electromagnetic waves have many interesting properties. For example, visible light can be reflected, or thrown back, from something. You can see reflection in action when you point a flashlight at a mirror. Light also can be **refracted**, or bent. Perhaps you've seen an example of refraction when you shone a light through a prism or crystal and a little rainbow appeared. In outer space, light bends when it goes past a planet. This bending occurs because the planet's gravity bends the light.



Invisibility

5 Scientists have wondered for a long time about electromagnetic waves and their properties. If we see light waves because the waves bounce off objects, then perhaps there is a way to **neutralize** the waves, or cancel them out.

6 What if a material could refract the waves around, or away from, an object? Then the object couldn't be seen. In a sense, it would be "hidden." A Russian scientist first thought of this idea in the 1960s, but that idea has led today to a breakthrough in invisibility: metamaterials.

Comprehension Check

Why does the author tell about the properties of electromagnetic waves before discussing invisibility?

CITE EVIDENCE

C In paragraph 4, circle a sentence that gives evidence for the idea that light can be reflected.

D Reread paragraph 5. Underline the scientific reasoning behind the idea that electromagnetic waves might be neutralized. How does that idea relate to invisibility?

ANALYZING REASONS AND EVIDENCE

Guided Practice

WORDS TO KNOW

distort
interact
manipulate

CITE EVIDENCE

A In paragraph 7, circle the sentence that supports the information in the diagram on page 241.

B In paragraph 11, underline the two sentences that give evidence for the idea that exciting advances in metamaterial technology are being made in this early part of the twenty-first century. What might be some of the results of these advances?

Becoming Invisible: Fantasy or Fact? *continued*

Metamaterials

7 Metamaterials are at the cutting edge of invisibility technology. What are metamaterials? They are materials that have been designed with unusual qualities, or properties—properties that no natural object could have. (*Meta* means "going beyond.") Metamaterials were inspired by the idea that electromagnetic waves can be refracted, or redirected, around an object.

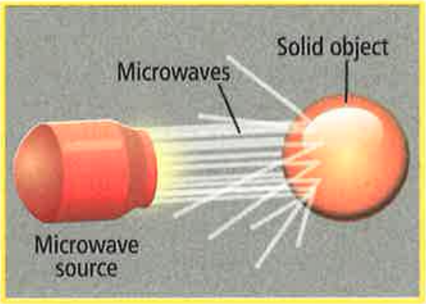
8 Metamaterials are extremely small. They are made of microscopically small elements, in fact, since they have to be smaller than the size of the electromagnetic wave that is racing toward them.

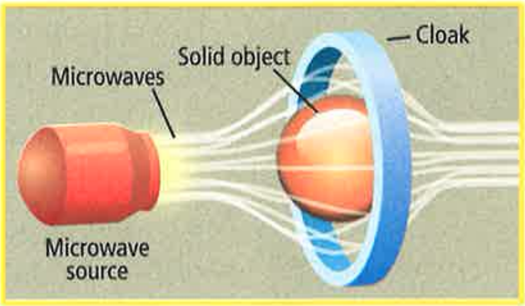
9 How do metamaterials work? When a wave hits a normal object, it **interacts** with the object's structure. That is why the object can be seen or sensed. Engineers have changed the structures of metamaterials so that the waves will behave differently when they hit the material. The structure of a metamaterial **distorts** the waves and sends them around the object. As a result, the object cannot be sensed.

10 An experiment done in 2006 showed that a fabric-like metamaterial, a kind of thin cloak, could refract microwaves. The "fabric" was made of very tiny rings. But microwaves, which are not visible to the human eye, are longer waves than visible light. A metamaterial that could refract the shorter waves of visible light would have to be composed of even smaller materials.

11 Just about a year later, though, there were several advances in metamaterials technology. In 2007, a scientist developed a metamaterial that could refract visible light. The only problem was that the material was extremely small. It was just 10 micrometers thick, or thinner than a human hair! That same year, some Chinese physicists developed metamaterials that could **manipulate** a different kind of wave: sound waves.

12 Metamaterial technology is still in its earliest days, but its future looks bright. Scientists are still looking into ways to create metamaterials that can act as "cloaking devices" to make people, vehicles, and even buildings invisible. But metamaterials are not the only path to invisibility.





Comprehension Check

1. What evidence supports the point that metamaterials are not natural materials?

a. Some metamaterials are made of tiny rings.

b. Metamaterials are extremely small.

c. Metamaterials can do things that natural materials cannot do.

d. Metamaterials can reflect and refract light.

2. To create "invisibility," metamaterials must have a changed structure. What reason does the author give to support this point?

a. Electromagnetic waves interact with most structures.

b. Some metamaterials are able to manipulate sound waves.

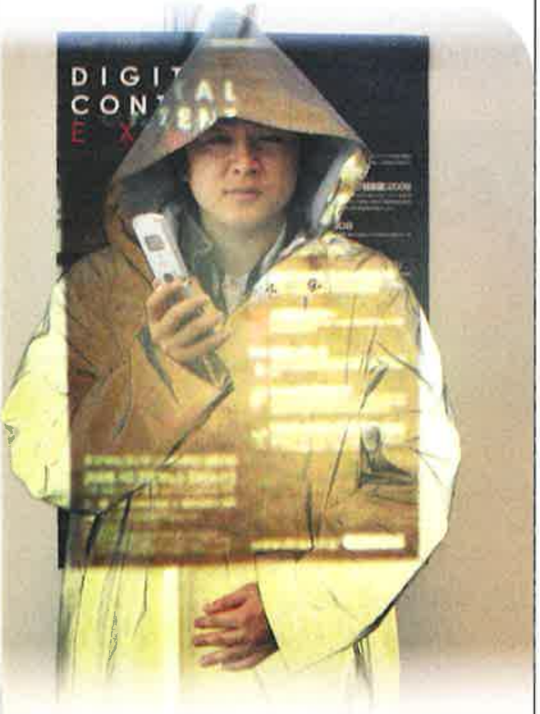
c. Metamaterials are extremely small.

d. Electromagnetic waves cannot be refracted.

3. What reasons does the author give to support the idea that the future of metamaterials looks bright?

____

____



WORDS TO KNOW

camouflage
projector
retro-reflection

CITE EVIDENCE

A In paragraph 14, put a star by a sentence that supports the idea that retro-reflection is commonly used.

B In paragraph 16, underline the reason that the film must be projected through a small hole. How difficult does this process seem?

Becoming Invisible: Fantasy or Fact? *continued*

Optical Camouflage

13 Another technology can create a kind of "invisibility": optical **camouflage**. When you see the word *camouflage,* you might think of the patterned uniforms that soldiers or hunters wear to blend in outdoors, or the way chameleons change color to match their surroundings. Optical camouflage is not quite so simple.

14 The first thing you will need for optical camouflage is a special item of clothing—a cloak—that is covered in very small beads. These beads have been engineered to refract light in a precise way so that the light bounces back in the same direction that it came from. This process is called **retro-reflection**. Retro-reflection exists in everyday life; for example, bicycle reflectors are retro-reflective and can be seen by nighttime drivers.

15 Your cloak is just the beginning. You will need some other equipment. First, set up a digital video camera so that it is at your back, pointed away from you. Record video footage of what is happening behind you.

16 Then you will need a computer that will process the images you recorded. You also will need a **projector** that can display the images on your special retro-reflective cloak. The film must be projected through a very small hole so that the images in the film match up with the size of your cloak.

17 You will need one more thing: a special mirror. This mirror will reflect the film onto the cloak and will send the film images back to the viewer. The mirror also will direct other surrounding light to the viewer. The mirror is important for the final effect: Viewers should be able to see the environment as well as the person who is wearing the cloak.

18 The final effect will be similar to what happens when you walk in front of a movie screen while a movie is being projected: You take on the appearance of your

background. But the background will blend into the image on your cloak, and you won't cast a black shadow behind you. With optical camouflage, you won't be completely invisible, but you won't be immediately noticeable, either.

19 Some invisibility is possible today, but only through complex and expensive technologies like metamaterials and optical camouflage. In the future, there will likely be simpler, more accessible ways to become fully invisible. Invisibility will no longer be a fantasy, but a reality.

Comprehension Check

MORE ONLINE **sadlierconnect.com**

1. Which piece of equipment is NOT needed for optical camouflage?

a. a special mirror
b. a projector
c. a digital video camera
d. a cloak made of metamaterials

2. Which statement best explains the purpose of the special mirror in optical camouflage?

a. It refracts light in the exact same direction that it came from.
b. The viewer looks at the final image in it.
c. It reflects the film onto a special cloak.
d. It projects the image onto a special movie screen.

3. What evidence in this section supports the author's point that invisibility is a complex and expensive technology? Cite evidence in your answer.

INTEGRATING INFORMATION FROM TEXTS

Guided Instruction

WORDS TO KNOW

fossil fuel
nonrenewable resource
renewable resource
sustainable

If you read more than one text about a topic, you can **integrate the information,** or combine it, in order to write or speak more knowledgeably about the topic.

CITE EVIDENCE

A You will be reading two texts about energy consumption and then **integrating the information** from both. In this first text, a blog, the author names problems with consuming too much energy. In paragraph 2, put a star by one of those problems.

B In paragraph 3, underline the example that supports the idea that people are overusing Earth's natural resources. Why is this a problem?

Let's Go Green!

by Vera S. Roshinski, MS in Environmental Science

(Genre: Blog)

1 As regular readers of my blog know, I'm a big fan of green energy. This rapidly growing area of science and technology develops environmentally friendly and self-sustaining energy sources.

2 Why green energy? Consider this: The developed nations are consuming too much energy. This overuse puts a terrible strain on Earth's natural resources. People can do many things to reduce their consumption of natural resources. I want to share some ideas. But first, let's be clear about how much energy we are using and why it's a problem.

Reducing Energy Consumption

3 There are many ways to measure our overuse of natural resources. Perhaps the most striking is our dependence on **fossil fuels**. Fossil fuels are resources that come from the earth. Oil, coal, and natural gas are fossil fuels that we use to generate electricity.

4 Fossil fuels are **nonrenewable resources**. In other words, someday they will be completely used up. Switching to **renewable resources** will keep us from depending on fossil fuels for all of our energy needs. These **sustainable** sources of energy—"green" energy—include wind power, solar power, and geothermal power.

5 Oil is an example of fossil fuel consumption. Most kinds of transportation require the use of oil. Oil also heats homes and businesses. Right now, the United States ranks first in the world in oil consumption. In fact, Americans use about 22% of all the oil in the world each year. But other large nations, such as China and India, are becoming big consumers of oil, too.

6 As we use up oil, its price rises. The price of oil has risen dramatically in recent decades, putting a strain on American families' budgets.

Protecting the Environment

7 Using fossil fuels can also harm the environment. Just obtaining the resources can be damaging. Both drilling for oil and mining for coal can harm the natural habitats of plants and animals living nearby.

8 Additionally, when the resources are used, they cause pollution. Burning coal, for example, releases carbon dioxide into the air. Many scientists link the increase in carbon dioxide to global warming, which has caused its own environmental problems. In addition, pollutants in the air harm humans, animals, and plants.

Comprehension Check

Summarize in your own words the two main reasons that the blogger is arguing in favor of using green energy sources.

Guided Instruction

CITE EVIDENCE

C As you read information, you want to remember it so that you can **speak or write on the subject knowledgeably** and with confidence. In paragraph 5, circle the specific information about how much oil the United States consumes.

D In paragraph 8, underline information about how using fossil fuels damages the environment. How does this information relate to the topic of green energy?

WORDS TO KNOW

conservation
principle

CITE EVIDENCE

A In paragraphs 10 and 11, put boxes around three ways that the California Academy of Sciences building is saving on energy costs.

B Review the section "Going Green at Home." Underline four ways that people can save energy at home. Then discuss which of the suggestions you and your family already do.

Let's Go Green! *continued*

Green Architecture

9 The ideal way for a business to "go green" is to follow the **principles** of green architecture in its building construction. Green architecture requires that people think about energy **conservation** and environmental protection before a building is built.

10 The California Academy of Sciences building in San Francisco is an award-winning green building. Its "Living Roof" is covered with six inches of soil that not only grows native plants but also provides insulation, saves rainwater, and helps to direct air currents. Skylights in the roof save on heating and cooling costs by releasing hot air from inside and bringing in cool air from outside. Solar panels on the roof are a sustainable energy feature that provides electricity.

11 Special glass was used to create the transparent outer walls. These glass walls bring in natural light, thus cutting down on electricity costs.

12 The building also runs on the principle that "warm air rises." Instead of using a forced-air central heating system that would waste energy in such a large space with high ceilings, hot water running through tubes under the floors provides heat that rises. And recycled denim jeans are used to insulate the building!

Going Green at Home

13 You don't have to be a big business or organization to go green. You can do a lot at home.

14 If you need to purchase appliances, such as washers and dryers, look for an EnergyGuide label. The label tells you that the U.S. Department of Energy has approved the appliance to be energy efficient.

15 Set air conditioners on timers so that they are not running all the time, especially when no one is home.

Guided Practice

16 Recycle materials. Use old T-shirts to wash the car. Save glass jars for leftovers. You'll reduce the energy needed to make new products.

17 Start a carpool to save gas. Ask your parents to take you and your friends to school all in one car. Or take the bus!

18 If businesses and people go green together, everyone will conserve energy and protect the environment.

Comments . . .

Post

Comprehension Check

1. One way in which the California Academy of Sciences has saved energy is by

- **a.** never heating the building at all.
- **b.** using a lot of glass in the building's construction.
- **c.** dumping rainwater as quickly as possible.
- **d.** using skylights on the roof to save on heating and cooling costs.

2. Why does the author suggest recycling materials in your home?

- **a.** Recycling is easier than shopping for new products.
- **b.** Recycling will lead to fewer new products being produced.
- **c.** Recycling is approved by the U.S. Department of Energy.
- **d.** Recycling is the easiest way to "go green."

3. How are the ways that businesses and people can "go green" similar and different? Discuss this question with a partner. Be sure to cite evidence from the text.

Independent Practice

WORDS TO KNOW

compatible
emit
fixture

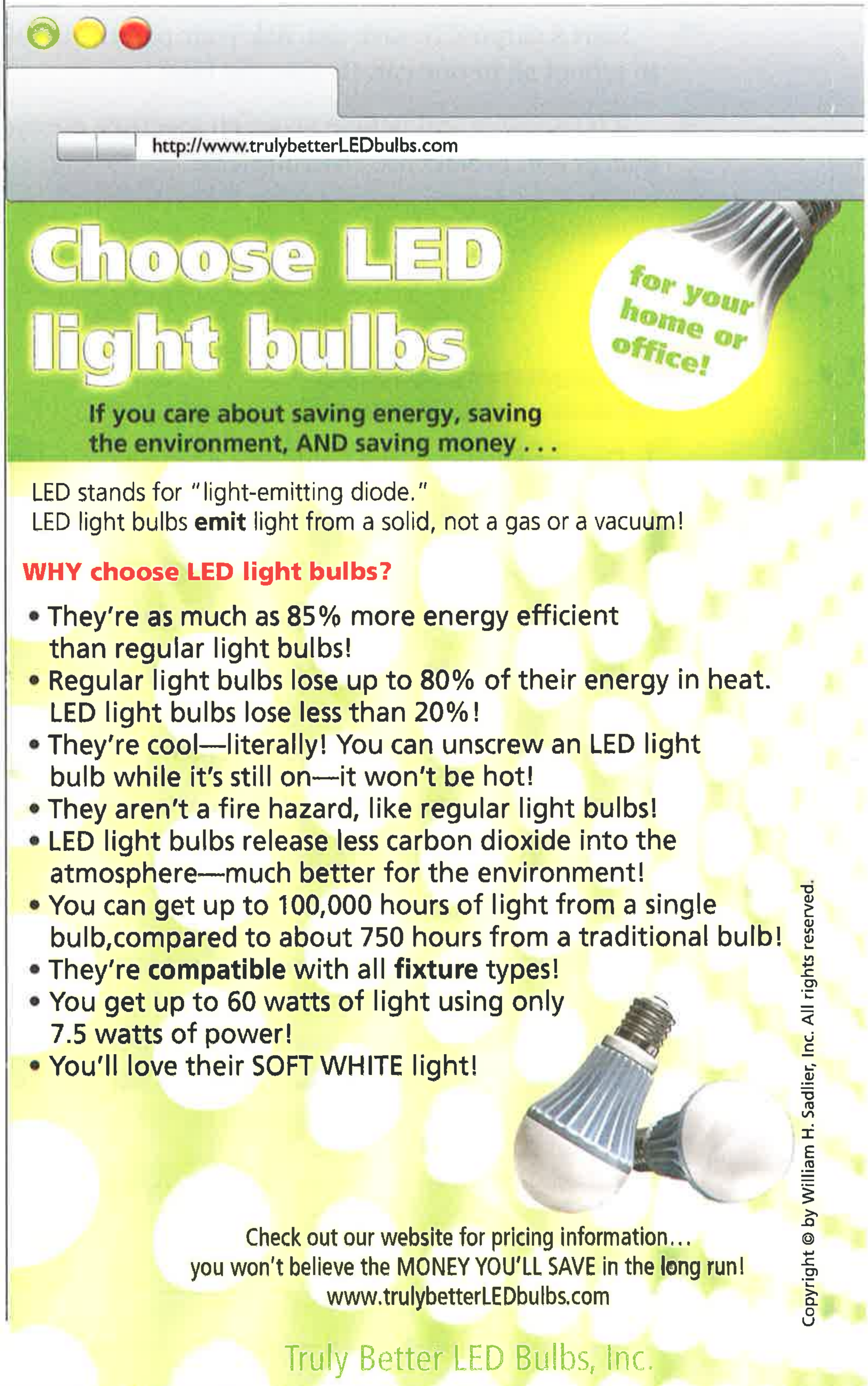
CITE EVIDENCE

A Put a box around the text in the ad that would be a good fit in the blogger's list of "Going Green at Home" ideas.

B Underline information in the ad that tells about the energy efficiency of LED light bulbs. What do you think the blogger would say about the way that LED light bulbs impact the environment?

LED Lights

(Genre: Internet Advertisement)



Choose LED light bulbs

If you care about saving energy, saving the environment, AND saving money . . .

LED stands for "light-emitting diode."
LED light bulbs **emit** light from a solid, not a gas or a vacuum!

WHY choose LED light bulbs?

- They're as much as 85% more energy efficient than regular light bulbs!
- Regular light bulbs lose up to 80% of their energy in heat. LED light bulbs lose less than 20%!
- They're cool—literally! You can unscrew an LED light bulb while it's still on—it won't be hot!
- They aren't a fire hazard, like regular light bulbs!
- LED light bulbs release less carbon dioxide into the atmosphere—much better for the environment!
- You can get up to 100,000 hours of light from a single bulb,compared to about 750 hours from a traditional bulb!
- They're **compatible** with all **fixture** types!
- You get up to 60 watts of light using only 7.5 watts of power!
- You'll love their SOFT WHITE light!

Check out our website for pricing information...
you won't believe the MONEY YOU'LL SAVE in the long run!
www.trulybetterLEDbulbs.com

Truly Better LED Bulbs, Inc.

Comprehension Check

MORE ONLINE **sadlierconnect.com**

1. Where would the blogger in the first selection be most likely to put information about LED lights?

a. in the section "Going Green at Home"

b. in her description of how fossil fuels harm the environment

c. in her description of the California Academy of Sciences building

d. as a main part of her argument about the need for green energy

2. Which of the following statements in this ad about how LED light bulbs are different from traditional light bulbs would NOT be information that the blogger would use to support the use of LED lights?

a. LED light bulbs are better for the environment.

b. LED light bulbs last much longer than regular light bulbs.

c. LED light bulbs emit light from a solid, not a gas or a vacuum.

d. LED light bulbs are more energy efficient.

3. Think about the information in the blog and in the advertisement for the light bulbs. In what ways are LED light bulbs a form of green energy that the blogger would approve of? Cite evidence from both texts to support your answer.

The Robot Cheetah

(Genre: Scientific Journal Entry)

1 I have been working on a special robotics program for several years, but I haven't written about it before now. It's been in early experimental stages for a long time. But since we've now had some success, it's time to write about the story.

2 I've been part of a scientific team that has developed a robot that can run faster than a human being! And here is the coolest thing: The robot is a cheetah!

Imitating Nature

3 I should begin by giving some background information about an exciting field of science that has a lot of impact on robotics. It is called biomimetics.

4 Biomimetics is a field of science that looks to nature for ideas. For example, in the earliest days of airplanes, people studied birds to learn principles that they could apply to flying machines. So, biomimetics is basically a way of imitating, or mimicking, nature.

5 Biomimetics urges humans to look to nature for ideas of how to do things more efficiently. In nature, there are many examples of energy efficiency—including the way some animals move.

6 Biomimetics is often used to help solve problems. What problem does our cheetah solve?

7 The robot cheetah has been part of a series of inventions funded by the United States Defense Department, which is responsible for the nation's security and armed forces.

8 For years, some people have dreamed of developing a robot that could replace a soldier. Soldiers can be killed or wounded, but a robot cannot. Nor can a robot get sick or tired.

9 Since many animals are stronger and more agile than humans, people started to imagine robotic animals that could be sent into hostile places. Such robots could deliver equipment, rescue humans, or even do the fighting in dangerous areas.

Studying the Cheetah

10 The cheetah was a perfect animal to study. It is a very strong, fast creature.

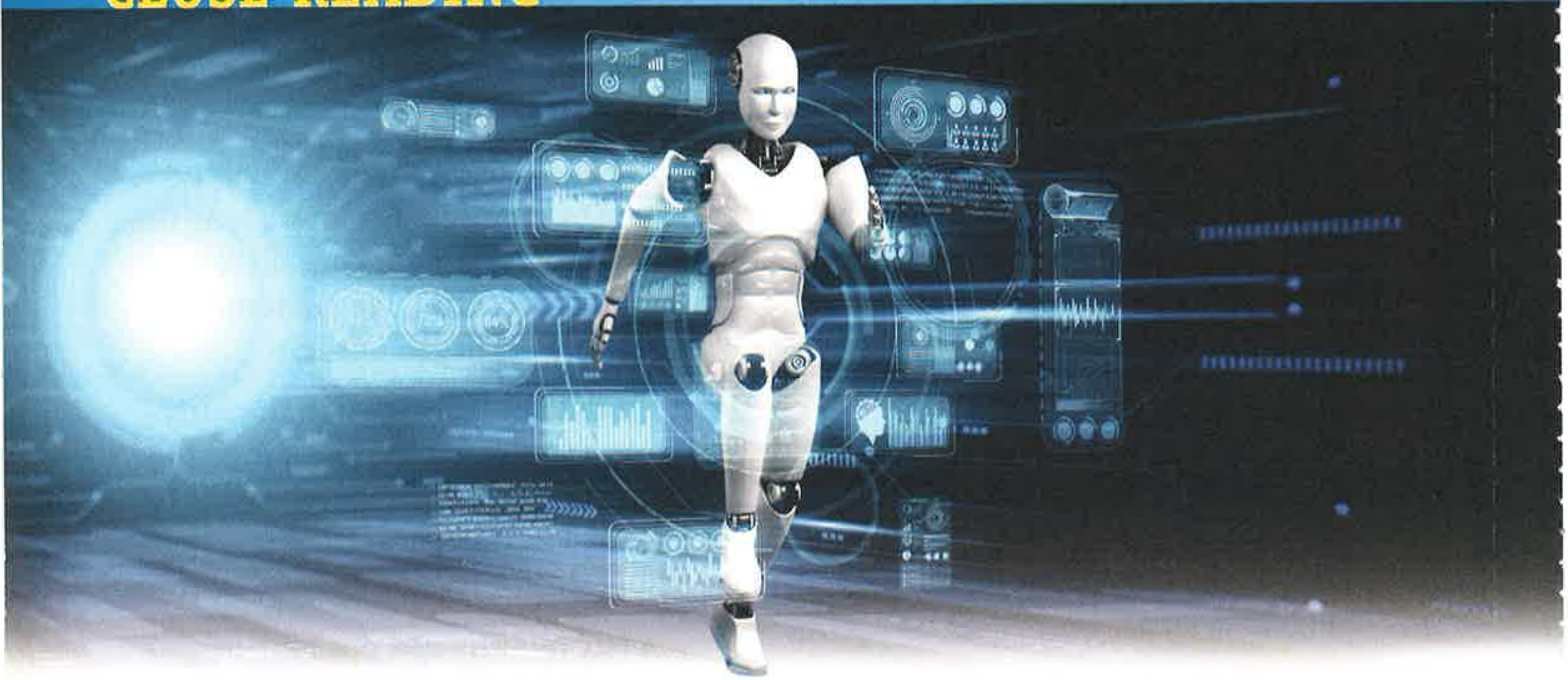
11 We focused on the cheetah's legs and its enormously long and powerful running strides. We designed special motors that imitated the movements of the cheetah's legs and shoulders.

12 We built a mechanical metal body to house these motors, and everything had to be connected. It took a long time, but we finally got our cheetah robot ready for a test run. We put it on a treadmill and began our test.

13 I should mention that in the early days, we got the robot cheetah to *trot* rather than *run*. Still, it could trot at a pace of 5 miles per hour for 90 minutes before slowing down.

14 A few months ago, our four-legged cheetah robot got up to 18 miles per hour. During our most recent test, our robot ran 28.3 miles per hour! That's even faster than the fastest human, who can run at an average speed of 23 miles per hour! Real cheetahs can run up to—and sometimes even faster than—60 miles per hour. That speed is our ultimate goal.

Robot Cheetah			Fastest Human	Real Cheetah
First Run	Second Run	Third Run		
5 mph	18 mph	28.3 mph	23 mph	60+ mph



Run, Robot, Run

15 So far, we have had to hold the cheetah robot in place with overhead cords. The robot is powered by hydraulics. In hydraulics, a fluid is pumped into a machine through a hose. Pressure builds and makes the machine move.

16 The robot cheetah has very high energy efficiency, even with the use of hydraulics. We're still trying to improve its efficiency, though. Robots use a lot of energy, and they often have to carry a heavy power source. Even then, their power doesn't last very long. We really have to "think green" when we're working on robotic energy efficiency.

17 We need to give our cheetah more power so it will run faster. We want it to run without having cords connected to it. Our goal is a faster robot cheetah that can run freely outdoors. We built something close to it a few years ago.

The BigDog

18 Our BigDog, as we called it, was a robot animal on four legs that could run outside without any cords attached. We tested it on snow and ice and it still worked. And—this is impressive—it could run for a distance of 20 miles with 400 pounds strapped to its back! Now you get a sense of the potential of these robot animals.

Into the Future

19 We're hoping that sometime in the next year or two we'll have a freer, more powerful version of our robot cheetah to reveal to the world. Imagine if we can get it to run at speeds of 60 miles an hour! It will be a huge breakthrough in the field of robotics. When it happens, I'll write about it, too!

Robot Cheetah on the Move

by Paula Z. Kay, Science Reporter

(Genre: Newspaper Article)

20 Last week, a local advanced robotics laboratory revealed that it had developed a robot cheetah that could run faster than the world's fastest human being.

21 This same laboratory had designed a so-called BigDog a few years ago, and it was a sight to behold: a computerized metal beast with four legs, hauling hundreds of pounds.

22 But the BigDog ran only 4 miles per hour. This robot cheetah has already run more than 28 miles per hour.

23 The robot cheetah is an odd-looking beast. It's all metal parts, wires, and cords. And it has no skin, so it is hard to recognize as a cheetah.

24 However, its movements are based on a real cheetah's movements. When it starts to move, it is an amazing thing. First comes the clicking of its metal feet on the treadmill. The pace of the clicking increases, and soon the whole thing is clicking, shaking, and then actually running.

25 Their next version of the cheetah, which will be called the WildCat, will run outdoors—and even faster.

Comprehension Check

1. What reason does the author of the journal give to support the idea that the robot cheetah is connected to the world of green energy?

a. The robot runs on natural gas.

b. The robot has a very high energy efficiency.

c. The robot can run faster than a human being.

d. The robot can haul hundreds of pounds.

2. Which of the following facts about the robot cheetah is found only in the short newspaper article?

a. It can run faster than a human being.

b. It is made of metal.

c. It is powered by hydraulics and is held up by an overhanging cord.

d. The next version of the robot cheetah will be named WildCat.

3. In the scientific journal entry, how does the information presented in the chart help the reader better understand the topic?

4. How is the robot cheetah an example of biomimetics? Cite evidence from the journal to support your answer.

Compare and Contrast Texts

In this unit, you read texts about amazing scientific and technological discoveries. Think about what you learned from these texts. Then choose two of the texts and compare and contrast them using the T-chart below. List key details and important points from the texts to show the similarities and differences between them. Be prepared to discuss your ideas with your class.

Similarities	Differences

Return to the Essential Question

What methods can authors use to present informational texts?

In small groups or as a class, discuss the Essential Question. Think about what you have learned from integrating texts about the same topic and from looking at the evidence and reasoning that an author provides. Also think about how information that was presented visually supported the main text. Use evidence from the unit texts to answer the question.

Roots

Guided Instruction If you read a word that is unfamiliar to you, check if it has a familiar Greek or Latin root. That root can provide you with a clue to the word's meaning.

The root of a word is the middle part, often unrecognizable, without any prefix or suffix attached to it. For example, the Latin root *ben-* means "good" or "well." A *benefit*, then, is a good or helpful result.

This chart shows the meaning of some Latin and Greek roots.

Greek or Latin Root	Meaning of Root	Example
-auto-	self	automatic
-bio-	life	biology
-flect-, -flex-	bend	deflect, flexible
-fract-	break	fracture
-geo-	earth	geology
-graph-	draw, write	graphic
-micro-	small	microwave
-phot-	light	photoelectric
-scope-	see, watch	telescope
-therm-	heat	thermal

Guided Practice Underline the root in each of the following words. Then write the meaning of the word on the line.

1. automobile ______________________
2. reflect ______________________
3. photograph ______________________
4. biography ______________________

Independent Practice Read the following sentences. Find the word that has at least one Greek or Latin root. Then underline the root or roots and write the meaning on the line.

1. You can use a microscope to see single-celled organisms.

____

2. Renewable sources of "green" energy include wind power, solar power, and geothermal power.

____

Read the passage and look at the time line. Pay attention to any evidence the author offers to support his or her ideas. Also, look for word roots. Then answer the questions on page 258.

Wind:

Energy for Today and Tomorrow

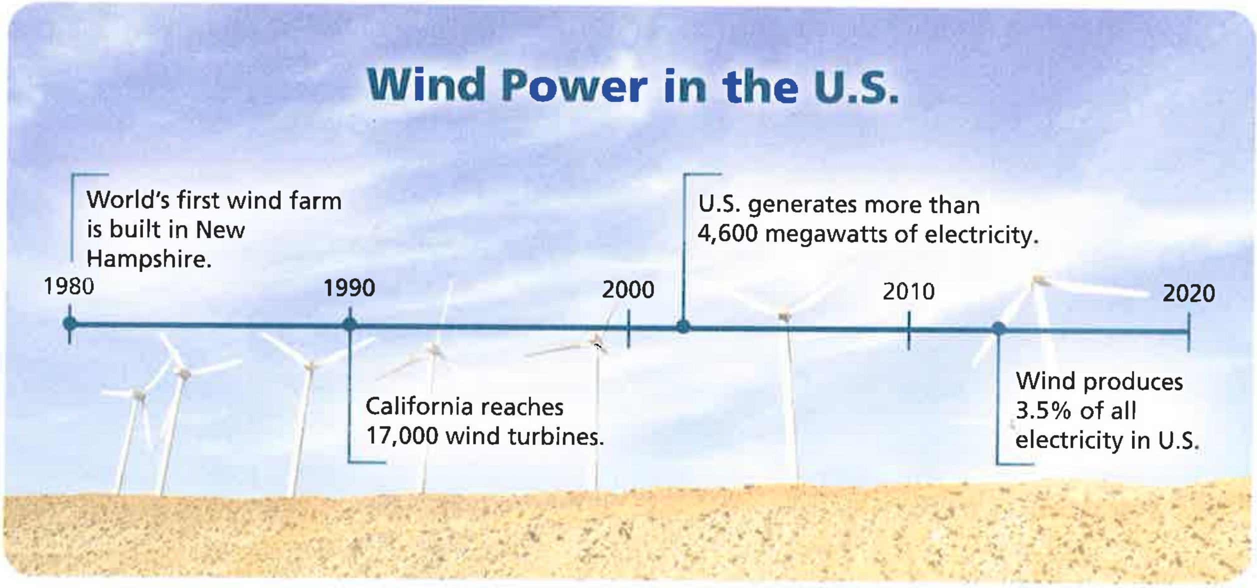
(Genre: Technical Text)

1 Using the power of the wind has become a popular energy alternative to burning fossil fuels. Wind power is harnessed on wind farms, where wind turbines spin as the wind blows. The turbines convert wind into electricity.

2 Wind power produces thousands of megawatts of electricity all over the world. Currently, wind accounts for about 3.5% of all electricity produced in the United States. There is a plan to generate 20% of the nation's electricity from wind power by the year 2030.

3 Wind energy is a clean kind of energy. It does not require the burning of fossil fuels, so no carbon dioxide is released into the air. Therefore, it does not contribute to global warming. Harnessing wind power also does not pollute water, as coal mining does.

4 Studies show that wind power could provide ten times as much electricity as the country needs. Nations around the world are considering how strong a commitment they will make to this promising energy source.


Wind Power in the U.S.

World's first wind farm is built in New Hampshire.

California reaches 17,000 wind turbines.

U.S. generates more than 4,600 megawatts of electricity.

Wind produces 3.5% of all electricity in U.S.

UNIT 11 REVIEW

1. Circle the correct choice. According to the time line, the world's first wind farm was built (in California in 1990 / in New Hampshire in 1980).

2. Circle the correct choice. The fact that wind produces 3.5% of the nation's electricity appears (in the text and the time line / in the time line only).

3. The Latin root of the word *popular* is most likely

   ○ *-pop-*, meaning "busy."
   ○ *-po-*, meaning "poor."
   ○ *-popu-*, meaning "loud."
   ○ *-popul-*, meaning "people."

4. Circle the correct choice. The Greek root *-gen-* means "birth." The word *generate* likely refers to (becoming older / producing something).

5. In the text, underline evidence that the U.S. is committed to wind power.

6. Circle the word in paragraph 3 that has a Latin root meaning "sphere."

7. What else might you need to learn about wind power before you could write or talk confidently about it?

8. How does the time line help you understand wind power better?

9. What text evidence supports the idea that wind power is green power?

10. Summarize what you learned about wind power from the time line.

PERFORMANCE TASK 2

There are three parts to this performance task. Your teacher will provide you with copies of three selections.

- "An Ancient Discovery" Genre: Realistic Fiction
- "Journal of an Archaeologist" Genre: Journal
- "Career Ideas: Archaeologist" Genre: Informational Text

Part 1: Literary Analysis

☐ Read "An Ancient Discovery" carefully. Take notes that will help you understand the passage.

☐ Answer Items 1–3 on pages 260–261.

☐ Then read the prompt for Item 4 and write two paragraphs on your own paper. You may want to make some notes on scratch paper first.

Part 2: Narrative Writing

☐ Read "Journal of an Archaeologist" carefully. Take notes that will help you understand the passage.

☐ Answer Items 1–2 about "Journal of an Archaeologist" on page 262.

☐ Review "An Ancient Discovery." You will use both passages in this task.

☐ Then read the prompt for Item 3 and write an essay on your own paper. You may want to make some notes on scratch paper first.

Part 3: Research Simulation

☐ Read "Career Ideas: Archaeologist" carefully. Take notes that will help you understand the passage.

☐ Answer Items 1–3 about "Career Ideas: Archaeologist" on pages 263–264.

☐ Review "Journal of an Archaeologist." You will use both passages in this task.

☐ Then read the prompt for Item 4 and write an essay on your own paper. You may want to make some notes on scratch paper first.

Part 1 Literary Analysis

Read all parts of the question before responding. Circle the correct answer to Items 1–3. Use your own paper to respond to Item 4.

Item 1

Part A Which three words best describe Rumi in the story "An Ancient Discovery"?

a. gentle and shy

b. lucky and bored

c. curious and helpful

d. strong and hungry

Part B Which details from the story support the answer to Part A?

a. Rumi sees a lot of people at the first dig site. He finds another site that his uncle had shown him.

b. Rumi wants to see the dig site. He carries supplies up the mountainside and helps Jill.

c. Rumi brushes dirt off the pottery. He asks his father questions.

d. Rumi eats breakfast quickly. He spends the day outdoors.

Item 2

Part A What is the main theme of "An Ancient Discovery"?

a. Even someone who is young can volunteer and be helpful.

b. It is important to respect your parents and other adults and to listen to what they say.

c. Pay attention and be careful when you work.

d. If you get bored, use your imagination.

Part B Which details from the story best support the answer to Part A?

a. Rumi asked to go with his father. He had to stay behind.

b. Rumi's uncle showed him ancient ruins. The ruins were in the jungle.

c. Rumi pretended to be an archaeologist. His father worked as a guide.

d. Rumi helped measure stone walls. He led them to a new dig site.

Item 3

Part A What does the word ***geography*** mean in this sentence from "An Ancient Discovery"?

His father knew a lot about the local ***geography***.

a. the study of archaeology

b. the language spoken in an area

c. the history of a people and their culture

d. the location of land features such as mountains

Part B Which word part helps the reader understand the meaning of ***geography***? What does the word part mean?

a. *graph* means "to speak"

b. *geo* means "earth or ground"

c. *ogra* means "the past"

d. *graphy* means "to dig"

Item 4

Think about Rumi's actions in the story and the events that took place. How are Rumi's actions and the story events related? Write two paragraphs to explain your answer. Use details from the story to help your answer.

Part 2 Narrative Writing

Read all parts of the question before responding. Circle the correct answer to Items 1–2. Use your own paper to respond to Item 3.

Item 1

Part A What is the overall structure of the text "Journal of an Archaeologist"?

a. cause and effect

b. problem and solution

c. sequence of events

d. comparison of ideas

Part B What features in the text support the answer to Part A?

a. The text gives facts about history.

b. The text tells what happens on each date.

c. The text explains that archaeology is dirty work.

d. The text explains what people ate in ancient times.

Item 2

What is the meaning of "unlocks the mysteries of the past" in the text?
I get to be a part of a team that unlocks the mysteries of the past…

a. discovers and shares information about history

b. writes books about people and places

c. enjoys stories about Roman people

d. uncovers buried items in the dirt

Item 3

Think about the events described in "An Ancient Discovery" and "Journal of an Archaeologist." Write two or three paragraphs explaining how the journal entries would be different if the writer was at a dig site in Peru instead of England. Describe what happens in a series of journal entries told in first person. Use ideas and facts from both passages to support your writing.

Part 3 Research Simulation

Read all parts of the question before responding. Circle the correct answer to Items 1–3. Use your own paper to respond to Item 4.

Item 1

Part A According to "Career Ideas: Archaeologist," what is one reason you might become an historical archaeologist?

a. because you might be part of a field crew that excavates
b. because you can excavate abandoned ships and airplanes
c. because you want to study relationships between Earth and people
d. because you like to read family records, diaries, letters, and maps

Part B Which sentence from the text supports the answer to Part A?

a. "A little water won't stop an archaeologist!"
b. "Sometimes they find the actual artifacts described."
c. "They look for ecofacts (natural remains)."
d. "They dig everywhere, including in old garbage piles."

Item 2

Part A What is the main idea of "Career Ideas: Archaeologist"?

a. Archaeologists have field crews that excavate.
b. Archaeologists excavate abandoned ships.
c. Archaeologists read historical documents.
d. Archaeologists have interesting jobs.

Part B Which sentence from the text supports the answer to Part A?

a. "If you like to read family records, diaries, letters, and maps..."
b. "Archaeology is tons of mystery-solving fun."
c. "Many archaeology projects have field crews who are new."
d. "Their work tells us about seafaring life and culture."

Item 3

Part A Which dictionary entry below best defines ***degree*** as it is used in this sentence from the text?

They might have a ***degree*** in archaeology.

de·gree (di-ˈgrē)

1. a step or stage in a process

2. the amount of burn damage done to skin by heat

3. a title given to students for completing a program of study

4. a unit of measurement used to tell temperatures

a. 1 **b.** 2 **c.** 3 **d.** 4

Part B Which key words in the Part A dictionary entries help the reader know which entry is the correct definition?

a. damage, heat

b. students, study

c. step, process

d. measurement, temperatures

Item 4

You have read two texts describing the job of an archaeologist. Think about the point of view and the facts in "Journal of an Archaeologist" and "Career Ideas: Archaeologist." How are the two passages alike? How are they different? Write two or three paragraphs that compare and contrast the point of view and information provided in each text.

Foundational Skills Handbook

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Base Words

A **base word** is a complete word that makes sense on its own. Many words are formed by adding a prefix or suffix to a base word. Recognizing the base word can help you read and understand these words.

Look at this chart to see how the base word agree is changed by adding prefixes and suffixes.

Word	Prefix	Base Word	Suffix	Meaning
agree**ment**		agree	**ment**	"act of agreeing"
disagree	**dis**	agree		"not" or "opposite of agree"
disagree**ment**	**dis**	agree	**ment**	"opposite of agreement"

Read the words in the chart. Decide if a prefix, suffix, or both have been added to the base word. Then write the word parts in the correct columns.

Word	Prefix	Base Word	Suffix
1. disobey			
2. careful			
3. proudly			
4. acceptable			
5. refillable			
6. premeasure			
7. distrustful			
8. settlement			

Read the words in the box. Sort them under the correct base word below.

helper protection respected unprotected respectable
helpless unhelpful protector disrepectful

9. help

______

______

______

10. protect

______

______

______

11. respect

______

______

______

Prefixes

A **prefix** is a word part that is added to the beginning of a base word. Adding a prefix creates a new word by adding to the meaning of the base word. Recognizing a prefix can help you read and understand an unknown word.

This chart lists some prefixes and their meanings.

Prefix	Meaning	Example
in-	"not"	**in**visible
co-	"with" or "together"	**co**pilot
mis-	"wrongly"	**mis**lead
en-	"cause to be" or "to make"	**en**rich

Join each prefix and base word. Write the new word on the first line. Then write the meaning of the new word on the second line.

1. mis + understanding ____________________

____

2. in + correct ____________________

____

3. co + exist ____________________

____

4. en + able ____________________

____

5. in + capable ____________________

____

Use three of the new words from the list above in sentences of your own.

6. ____________________

7. ____________________

8. ____________________

Suffixes

A **suffix** is a word part or syllable that is added to the end of a base word. A suffix creates a new word by adding to the meaning of a base word. Recognizing a suffix can help you read and understand an unknown word.

This chart lists some suffixes and their meanings.

Suffix	Meaning	Example
-less	"without"	use**less**
-like	"resembling"	life**like**
-y	"full of" or "having"	mess**y**
-ity	"state or condition of"	real**ity**
-ive	"able to" or "tending"	creat**ive**

Join each base word and suffix. Write the new word on the first line. Then write the meaning of the new word beneath it.

1. hope + less ________________________________

____

2. health + y ________________________________

____

3. humid + ity ________________________________

____

4. dream + like ________________________________

____

5. adapt + ive ________________________________

____

Use one of the new words from the list above in a sentence of your own.

6. ________________________________

____

Latin and Greek Roots

Many English words have Latin or Greek roots. A **root** is a word part that has meaning, but it is not always a word on its own. Knowing the meaning of a word's Latin or Greek root can help you read and understand it.

> *A smart shopper will **inspect** a product carefully before buying.*

The word *inspect* has the Latin root *spect*, which means "see" or "look."

Study these Latin and Greek roots and their meanings.

Root	Meaning	Example
audi	"hear or listen"	audit
dict	"say or tell"	dictator
tract	"pull or draw away"	extract
astro	"star"	astronomer

Read the words in the word bank. Decide which Latin or Greek root is in each word, and then sort each word into the correct column.

attract distract audible predict
astronaut auditorium dictate astronomy

audi	dict	tract	astro
______	______	______	______
______	______	______	______

Choose the word from the box above that best completes each sentence. Think about the meaning of the root to make sure the word makes sense.

1. The cookie crumbs will ______ ants and flies.
2. It was her dream to become a(n) ______ and travel in space.
3. Graduation was held in the ______ because of the weather.
4. A meteorologist uses many tools to ______ the weather.

Open and Closed Syllables

A **syllable** is a word part that has one vowel sound. Breaking longer words into syllables can make them easier to read. Here are some rules to help you.

When there is only one consonant between two vowels in a word, divide the word before the consonant and try the long vowel sound. This is called an **open syllable**.

Example: music → mu-sic

Sometimes dividing a word this way doesn't work; instead, you must divide the word after the consonant and try the short vowel sound. This is called a closed syllable.

Example: signal → sig-nal

If you divide the word *signal* before the consonant (si-gnal) and try the long vowel sound, you will not pronounce the word correctly. However, if you divide it after the consonant (sig-nal) and try the short vowel sound, you will pronounce the word correctly.

Write each word, dividing it into syllables with a hyphen. The first one has been done for you.

1. jungle **jun-gle**
2. human ______________
3. clover ______________
4. shiver ______________
5. punish ______________
6. declare ______________

Read each sentence. Then divide the underlined words into syllables on the lines below the sentence.

7. The napkins and a platter of vegetables are on the table.

____

8. Focus your attention on the basic problem.

____

9. The vibrant colors of the textile caught my attention.

____

Syllables with Vowel Teams

Breaking longer words into syllables can help you read the words. A syllable has one vowel sound, but that vowel sound may be spelled with more than one letter. The rules below tell you when you can divide the letters that stand for the vowel sound.

- Some words have two vowels that make one sound. These **vowel teams** stay together in a syllable. These vowel teams include *ai, ea, ei, ie, oi, oy,* and *au.*

creature	sweater	royal	autumn
cr**ea**-ture	sw**ea**t-er	r**oy**-al	**au**-tumn
explain	receive	believe	appoint
ex-pl**ai**n	re-c**ei**ve	be-l**ie**ve	ap-p**oi**nt

- Some words have two vowels together that make separate sounds. For these words, divide the word into syllables between the two vowels.

diet	poem	duet	create
d**i**-**e**t	p**o**-**e**m	d**u**-**e**t	cr**e**-**a**te

Write each word, dividing it into syllables with a hyphen. The first one has been done for you.

1. feature fea-ture
2. neon ______________
3. faucet ______________
4. beneath ______________
5. dial ______________
6. relief ______________
7. riot ______________
8. fluid ______________
9. remain ______________
10. giant ______________
11. science ______________
12. deceive ______________

Syllables with *r*-Controlled Vowels

Recognizing spelling patterns in syllables can help you break down words into smaller parts. When a vowel is followed by the letter ***r***, the letter *r* changes the sound of the vowel. The vowel and the *r* appear in the same syllable.

forest	dirty	bury	fever
f**or**-est	di**r**t-y	b**ur**-y	fev-**er**

Read each word. Underline the letters that stand for the *r*-controlled vowel sound. Then divide the word into syllables on the line next to it. The first one has been done for you.

1. circle cir-cle
2. moral ____________
3. spirit ____________
4. cherish ____________
5. plural ____________
6. storage ____________
7. florist ____________
8. sterilize ____________
9. glorify ____________
10. experiment ____________

Choose the word from the list above that best completes each sentence. Then take turns reading the sentences with a partner.

11. We use the attic and basement for ____________.
12. I ____________ the gifts from my family and friends.
13. The word *mice* is the ____________ of the word *mouse*.
14. The beautiful flowers were delivered by the ____________.
15. His team ____________ encouraged the players to do their best.
16. We must ____________ the glass jars to get rid of any bacteria.
17. The scientist conducted a(n) ____________ to test her idea.
18. There is always a(n) ____________ to the story in a fable.

Words with Silent Consonants

You can often figure out an unfamiliar word by sounding out the letters in the word. Sometimes words have **silent consonants**. Learning rules for reading silent consonants will help you read and understand these words.

- When the letters *ght* are together in a word, the letters *gh* are silent.

  fi**ght** bri**ght** ti**ght**

- When a word begins with the letters *kn*, the *k* is silent.

  knuckle **kn**ead **kn**ow

- When the letters *gn* are together in a syllable of a word, the letter *g* is silent.

  gnat **gn**aw forei**gn**

- When a word ends with the letters *mb*, the letter *b* is silent.

  la**mb** cru**mb** li**mb**

Read each sentence. Find the word or words that have silent consonants and underline the silent letters. The first one has been done for you.

1. I knew we were in trouble when I saw the danger sign.
2. The night sky was so clear, it was easy to find constellations.
3. We set out early in the morning to climb Mount Baker.
4. The plumber hit his right thumb against the pipe.
5. I couldn't loosen the knot because my fingers were numb from the cold.
6. A bear might frighten the sleeping campers.
7. I hoped my teacher wouldn't assign any homework over the weekend.
8. She spent the afternoon with her grandmother, learning how to knit a scarf.

Practicing Fluency

Read the following excerpt from a retelling of a Japanese folk tale. Use the checklist at the bottom of the page to help guide your reading.

The Envious Stonecutter

from a Japanese Folk Tale

Koji, a simple stonecutter, was chipping away at a mountain one afternoon when a wealthy prince paraded by. Koji wept with envy for a grander life, so he appealed to the spirits. "Please, can you change me into a prince?" he begged. The spirits agreed to grant Koji's wish.

Koji the prince enjoyed the comforts of his beautiful home and garden. One day, though, after the sun scorched his prized blossoms, Koji felt envious again. "Kindly spirits! Since the sun outshines any prince, I beg to become the sun!" he pleaded. And so it came to be.

As the sun, Koji suddenly grew prideful. He boasted by blistering the earth until its creatures howled for relief. Only the mountaintops were not scorched by his rays.

When Koji saw the mountains unharmed, his envy returned. He begged to become a mountain. But the next morning, Koji awoke to find a stonecutter chipping away at his base. Once more his longing led him to call to the spirits, "Oh, if I were only a man!"

Now read the story aloud to a partner. Use the checklist below and your understanding of the story to guide your reading.

Reading Checklist

- ☐ Does my voice go up if there is a question mark? Does it get stronger if there is an exclamation point? Do I pause for periods and commas?
- ☐ How should a character's thoughts or words affect how I read?
- ☐ How does the tone or mood of the story—suspenseful, scary, sad, happy—change the way I read? (Remember, the tone or mood can change more than once in a story.)

Writing Handbook

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WRITING HANDBOOK

This year, you will write a fictional narrative, an informative/explanatory essay, an opinion piece, an evidence-based essay, and a research report. This handbook is your guide to writing all these types of texts. It takes you through steps of the writing process, which help you move from ideas to a finished piece of writing. Once you know the steps, you can use them for any kind of writing.

STEP 1 Planning

Let's say you are going to write an opinion piece about whether we can learn from the actions of heroes, both real and fictional. Good writing begins with planning. To plan, begin by asking yourself some questions.

- **What** am I writing?

  You are writing an opinion piece. This type of essay takes a stand on an issue and supports it with strong reasons. It is nonfiction because it does not tell a story, but instead argues for a position.

- **Why** am I writing? What is my **purpose**?

  Your purpose for writing is your reason for writing. For this assignment, your purpose is to persuade, or to convince others of your opinion. You will do this by providing strong reasons that explain why we can or cannot learn from the actions of heroes.

- **Who** is my audience? Who will read my writing?

  In this case, your audience is anybody who is interested in the subject of heroes as examples of good behavior.

  Now you are ready to think of ideas and organize them. An outline is one way to plan.

- Begin with your **topic.**

  For informational text, begin by thinking about your topic, or the central idea of your writing. In an opinion essay, your topic is your opinion on a specific issue. Ask yourself, "Can we learn from the actions of heroes—even fictional ones?" The answer to this question is your position, or point of view, on the subject.

  For a fictional narrative, begin by thinking of a problem characters might face, as well as the solution to that problem.

- Then add **details**.

  For an opinion piece, provide reasons, facts, and examples that support your point of view. Many of these may come from your own ideas and experiences, but some may require research.

  For a fictional narrative, you would add characters, setting, and plot events to the basic idea for a story.

RESEARCH TIP

For this topic, part of the information you need may come from reading you have done. You can use books, magazines, online sources, and even interviews with other people as sources of information about real-life and fictional heroes. Be sure to take notes from the sources you use. Sort the information in the notes to help you organize your writing.

Here's what an outline for your opinion essay on heroes might look like. This outline shows six paragraphs—one for the introduction, four for the subtopics in the explanation, and one for the conclusion.

Heroes Help Us

I. **Introduction**
Topic: Heroes help us. They teach us how to overcome obstacles and solve problems. Even fictional heroes can help us learn ways of dealing with life's challenges.

II. **Supporting Reasons**
Subtopic 1: Brave people
Facts: ____________________
____

Subtopic 2: Leaders
Facts: ____________________
____

Subtopic 3: Inventors
Facts: ____________________
____

Subtopic 4: Fictional heroes
Facts: ____________________
____

III. **Conclusion** ____________________

PLANNING TOGETHER

You may want to plan your writing with a partner. Having a question-and-answer session with a partner can help you to clarify your ideas. You might brainstorm together. Let one idea lead to the next.

STEP 2 Drafting

When you draft, you do the actual writing of your essay. Many writers use a computer to write drafts. Follow your outline, but don't worry about making everything perfect. Just write and get your ideas down!

Here is a handwritten draft of an opinion piece about how heroes help us. This is a great start!

Heroes Help Us

Heroes help us. They teach us how to overcome obstacles and how to solve problems. Even fictional heroes can do this.

Real people who show bravery teach us. For example, think of that brave patriot Paul Revere. He faced the dangers of capture or death but he didn't fail to act. He believed in the cause of freedom so strongly. He rode all night to warn others of a threat to freedom.

Leaders teach us many lessons to. Look at how Martha Washington helped soldiers during the Revolutionary War. Her assistance meant they could keep fighting for independence.

Inventors provide us with excellent examples of how to work toward a goal. Many of them experience failure many times before they succeed. They keep at it, though. They do not give up until they achieve their goal.

Even fictional heroes. Writers tell stories about people facing problems. We can learn from how they work with others. We can see how they handle those problems.

Reading about heroes, both real and fictional, helps us see how some people met challenges. Heroes give us important lessons in how to live.

STEP 3 Revising

During this step, you think about how to make your writing better. This step is about ideas, not about details like spelling and grammar. Use the items in the checklist below to focus your ideas. Then make changes on your computer or on a handwritten copy. If you are using pencil and paper, make a fresh copy.

REVISING TOGETHER

- You can work with a partner to revise your work. Have your partner read your draft and use the checklist below to give you feedback. Use your partner's feedback to revise your draft.
- Finally, read your revised draft aloud to yourself or to your partner. See if you want to make any more improvements.

REVISING CHECKLIST

Ideas and Voice

☐ Do all of my reasons support my opinion?
☐ Have I developed my ideas by including enough facts and examples?
☐ Have I used information and evidence from my research?
☐ Does my writer's voice sound interesting and persuasive?

Organization and Coherence

☐ Does my introduction state my topic clearly?
☐ Have I grouped related ideas to support my purpose?
☐ Have I used linking words such as *in addition* and *for example* to connect my reasons to my opinion?
☐ Are all of my sentences in a logical order?
☐ Do I have a strong concluding section that relates to my opinion?
☐ Have I used a variety of sentence types?

Word Choice

☐ Have I used precise words?
☐ Have I avoided using the same words over and over?
☐ Do my words bring my ideas to life?

Here is a draft with notes for revisions. To see the revised draft, turn to page 282.

I want to make my second sentence more specific.

Heroes ~~Help~~ Teach Us

Heroes help us. They teach us many lessons like how to overcome obstacles and how to solve problems. Even fictional heroes can do this.

Real people who show bravery teach us. For example, think of that brave patriot Paul Revere. He faced the dangers of capture or death, but he didn't fail to act. ~~He~~ Because he believed in the cause of freedom so strongly. ~~He~~ he rode all night to warn others of a threat to freedom.

Leaders teach us many lessons to. Look at how Martha Washington helped soldiers during the Revolutionary War. Her work meant a lot to them.

I want to use a more precise word than "work" that connects to the idea of helping and explains more clearly how her help mattered.

Inventors provide us with excellent examples of how to work toward a goal. Many of them experience failure many times before they succeed. They trying keep at it, though they do not give up until they achieve their goals.

Even fictional heroes. Writers tell stories about people which face problems. We can learn from how they work with others. We can see how they handle those problems. Reading about heroes, both real and fictional, ~~helps~~ can help us see how some people met challenges. ~~Heroes~~ In this way, heroes give us important lessons in how to live.

I need to move this sentence to make the order more logical.

STEP 4 Editing

This step is about making your writing correct. Now is the time to focus on grammar, punctuation, and spelling. Read your revised draft carefully. Sometimes it helps to read it aloud. Use the Editing Checklist below and the Proofreading Marks chart on page 282 to correct errors in your writing on the computer or in your handwritten draft.

Always proofread and correct your own work. Seeing your own mistakes can be difficult, though, so asking a partner to help check your work can help.

EDITING CHECKLIST

Sentences

- ☐ I have corrected any sentence fragments or run-on sentences.
- ☐ I have not left out any words, and I have deleted any extra words.
- ☐ I have used a variety of sentence types.

Grammar

- ☐ The subject and verb of every sentence agree.
- ☐ The verb tense stays the same throughout.
- ☐ I have placed any adjectives in the correct order.
- ☐ Pronouns match the nouns they replace.
- ☐ I have used coordinating and subordinating conjunctions correctly.
- ☐ I have formed and used prepositional phrases correctly.

Mechanics

- ☐ Every sentence begins with a capital letter and ends with the correct punctuation mark.
- ☐ Commas, quotation marks, and other punctuation marks are used correctly, and no marks are missing.
- ☐ The title and all proper nouns are capitalized.
- ☐ Paragraphs are indented.

Spelling

- ☐ I have used a dictionary to check spellings I am unsure about.
- ☐ I have correctly used frequently confused words, such as homophones (words that sound the same, like *their/there/they're*).

PROOFREADING MARKS

^	Add	ℓ/	Take out	/	Small letter
⊙	Period	≡	Capital letter	◯	Spelling error

Heroes Teach Us

Heroes teach us many lessons, such as how to overcome obstacles and how to solve problems. We can even learn simalar lessons from fictional heroes.

For example, think of that brave Patriot Paul Revere. He faced the dangers of capture or death but he ~~didn't~~ did not fail to act. Because he believed in the cause of freedom so strongly, he rode all night to warn others of a threat to freedom.

Leaders teach us many lessons ~~to~~ too. Look at how Martha Washington helped soldiers during the Revolutionary War. Her assistance meant they could keep fighting for independence.

Inventors also provide us with excellent examples of how to work toward a goal. Many of them experience failure many times before they succeed. They keep trying, though⊙ they do not give up until they achieve their goals.

Even fictional heroes can teach us valuable lessons. Writers tell stories about people ~~which~~ who face problems. We can see how they handle those problems. We can learn from how they work with others.

Reading about heroes, both real and fictional, can help us see how some people met challenges. In this way, heroes teach us important lessons about how to live.

STEP 5 Producing, Publishing, and Presenting

Now that you've worked so hard on your writing, it's time to share it with others! Think about how your writing looks. Is it neatly handwritten, or typed and printed from a computer?

Would images add interest or important information?

- photographs
- illustrations

Would other text features make your ideas easier to understand?

- headings and subheadings
- diagrams
- graphs
- charts
- maps

Think about the final form of your writing. Be sure the way you present the final version of your work fits your purpose and audience.

Once you finish a piece of writing, you might be asked to share it with classmates in a speech or other presentation. When you shift from written English to spoken English, you may make some changes to give your speech more of a natural flow. Follow these rules to make your oral presentation effective.

DIGITAL CONNECTION

Technology makes it easy to present your writing to a bigger audience, especially on the Internet.

- Determine how formal or informal you need to be. Use language that fits your audience and the occasion.
- Use visuals as needed to support what you say.
- Speak clearly and loudly enough for everyone to hear.
- Speak slowly enough so that everyone can understand you.
- Change the pitch, rate, and loudness of your voice to express your ideas, show emphasis, and create an emotional effect.
- Make your gestures and facial expressions match your words.
- Ask your audience if they have any questions. Listen carefully and answer politely. Take time to think before you respond.

LISTENING TIPS

- Keep your eyes on the presenter, and focus your mind on the ideas.
- Make connections from what you hear to what you already know.
- Take notes. Include questions you want to ask.
- Try to picture the things that are described.

GLOSSARY

A

anticipation excited waiting

assemble gather together

audibly able to be heard

B

bargain deal; getting something cheaply

basin valley; hollowed-out area of land

bedrock a solid layer of rock deep underground

biography the story of someone's life

brawn size and strength

C

calculate figure out using math or logic

camouflage something to let someone blend into his surroundings; disguise

cautious careful; watching out for danger

challenge try to fight

chamber closed-in space; compartment

charity understanding feelings; forgiveness

chided scolded

circumstance situation; fact

collapse falling down in exhaustion

colonist person who moves to a new area

compatible working well with

concede admit; accept

conclusion idea; decision

confederacy a group that works together

consequence result; effect

conservation saving; using less of something

continental drift movement of the continents

converted changed

coordinate location described in mathematical terms

custom habit

D

data facts; information

declined turned down

defiance disobedience; refusal to give in

democracy government by the people

demonstrates shows

derived got

destination the place where one is going

deteriorates becomes not as good

devastating horribly destructive

devoted loyal and loving toward

displacement pushed out of place; movement

disruption interruption; trouble

distort twist; make out of shape

distribution delivery; giving out

diverse having many differences

drill practice exercise

GLOSSARY

E

earthquakes shaking of the Earth's surface

electromagnetic spectrum the different sizes of waves light comes in

elude escape; keep from being caught by

emit send out

energy power; force

equipped prepared with correct tools

erosion the breaking down of rocks or land

escape velocity the speed needed to get out of Earth's gravity

exhausted very tired

explosive likely to explode or burst out

F

fault line where two pieces of the Earth's crust come together

fiery showing strong emotions and energy

fixture place to plug in a light bulb

flash flood a sudden, dangerous flood

focus clear view

foolhardy foolish

foolish silly; unwise

formation form or shape

fortifications defenses

fossil fuel power-making material created from the remains of ancient creatures

frostbite freezing of the skin

G

gale strong wind

generated created

glacier huge mass of ice

glare bright light

griddle frying pan

H

hardship difficulty; problem

hull the body of a ship

I

immensely hugely; greatly

immobile not moving

impression picture that stays in someone's mind

injustice unfairness

innovative full of new ideas; creative

inspection examination; check

intensely powerfully; strongly

interact work with or act on

L

labored worked

lacrosse a ball game invented by Native Americans

landmass large section of land

landscape countryside

language set of words a group uses to speak

GLOSSARY

lecture scold

limb arm or leg

longhouse home of great length that could house many people

M

manipulate change; handle

mantle a layer of the earth under the surface

merchant ship a ship carrying goods to be sold

miser a person who saves money and never spends it

misery unhappiness; suffering

monitor watch

morale mood

motivate encourage to act

mountain range line of mountains

N

natural disaster terrible event caused by nature

neutralize take away something's power

nonrenewable resource natural supply that can be used up

O

ominous threatening; dangerous

opportunity chance to do something

oppressed treated badly

orbital velocity the speed needed for an object to circle around a star or planet

orbiting circling around a planet or star

P

particle tiny piece

permanent lasting forever

perplexed confused

plate tectonics science that studies how continents move

prediction idea about what will happen next

principle main idea or belief

projector something that shines out light or images

promoted given a higher position or job

prospect possibility; idea

provisions food supplies

R

range difference

rash without thinking things through

refracted bent

renewable resource natural supply that will not run out or be used up

reservoir a lake used to store water

retrieve bring back

retro-reflection the action of a form of mirror that throws back light from its surface

revolution war fought to change governments

rousing energetic and inspiring

route path

S

sachem Native American leader

sandbank a ridge of sand sticking out of an ocean or a river

sandhog worker who builds water tunnels

satellite an object that circles around a planet or star

sediment dirt; soil

site place; spot

sleigh a carriage that slides over the snow

snubbed ignored; passed over

sonorous deep and booming

species type of animals

sprained hurt a joint by twisting

strife war; fighting; trouble

supply shaft tunnel or tube that carries materials from one place to another

sustainable able to keep going; lasting

symbolic something true in an idea rather than in fact

T

tauntingly mockingly

technology use of machines and/or computers

terrain land

thermal warm

transformed changed

treacherous dangerous

tsunami giant wave

tyrant cruel ruler

U

universe everything that exists in space

V

valve control that limits how much water flows through a pipe

venturing going

vexation annoyance; to be upset

volume loudness

W

weathering the breaking down of rocks by rain, snow, hail, and wind

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